ASSERTIONS OF ENTITLEMENT TO THE OUTER CONTINENTAL SHELF IN THE CENTRAL ARCTIC OCEAN

BJØRN KUNOY*

Abstract The legal and technical issues relating to the outer continental shelf entitlements in the Central Arctic Ocean present several challenges, most of which are to be resolved in accordance with Article 76 of the United Nations Convention on the Law of the Sea. Recently, two coastal States in the Central Arctic Ocean have made fully fledged submissions relating to the Arctic to the Commission on the Limits of the Continental Shelf. Russia has made a revised submission that is currently being considered by the Commission on the Limits of the Continental Shelf. The submission of Denmark/Greenland will most likely only be considered in 10 or 15 years time.

Keywords: Central Arctic Ocean, Commission on the Limits of the Continental Shelf, Continental Shelf, entitlement, outer continental shelf, submarine elevation, submarine ridge.

I. INTRODUCTION

Most of the Central Arctic Ocean seabed is open to claims of entitlement to a continental shelf beyond 200 nautical miles (nm) from the baselines from which the breadth of the territorial sea is measured. Article 76(1) of the United Nations Convention on the Law of the Sea (UNCLOS)[1] provides that the continental shelf extends throughout the natural prolongation of the land territory to the outer edge of the continental margin, or to a distance of 200 nm from the baselines where the outer edge of the continental margin does not extend up to that distance.[2] Coastal States that intend to establish outer limits of their continental shelves beyond 200 nm 'shall submit particulars of such limits'[3] to the Commission on the Limits of the Continental Shelf (CLCS), established under Annex II to UNCLOS.

* Ministry of Foreign Affairs and Trade of the Faroe Islands, bjornk@uvmr.fo. The views expressed in this article are strictly personal to the author. The author would like to thank Michael A Becker and an anonymous reviewer for their comments to a previous version of this article. The author is, of course, solely responsible for all of the observations and judgments contained in this article.

[1] 1833 UNTS, 396 (entered into force on 16 November 1994).

[2] Art 76(1) of UNCLOS provides: 'The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.'

[3] Excerpt from art 4 of Annex II to UNCLOS.

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Five coastal States border the Central Arctic Ocean. Three of these States have submitted their claims of entitlement to an outer continental shelf in the Central Arctic Ocean to the CLCS.[4] The two remaining coastal States are expected to present such claims[5] in due course, although one is a non-State Party to UNCLOS.[6]

Claims of entitlement to continental shelf in the Central Arctic Ocean raise intricate legal and technical questions. This arises in particular with regard to the question whether geology has a role in establishing entitlement to these areas of seabed, and if so, to what extent. In the *Bay of Bengal* case, the International Tribunal for the Law of the Sea (ITLOS) held that it 'cannot accept Bangladesh's contention that by reason of the significant geological discontinuity dividing the Burma plate from the Indian plate, Myanmar is not entitled to a continental shelf beyond 200'.[7] The meaning of this finding may be determinative in establishing whether active oceanic spreading ridges can be integral parts of continental margins whose land mass is composed of continental crust.

Of particular interest for the Central Arctic Ocean is the Gakkel Ridge. This seafloor high is an active oceanic spreading ridge which is separated from the landmass of Greenland by a 'significant geological discontinuity', to use the expression used by ITLOS when emphasizing that the demonstration of natural prolongation does not require that the seabed in question is geologically linked with the land mass of the relevant coastal State. It would appear from the publicly available data that Denmark/Greenland relied on the understanding of ITLOS when including the Gakkel Ridge, an active oceanic spreading ridge, within its proposed outer limits that were submitted to the CLCS on December 2014.[8] Yet, commentators appear to contend that

[4] Russia lodged an initial submission on 20 December 2001, which has been supplemented by two revised partial submissions, the latter of which covers areas in the Central Arctic Ocean and was submitted to the CLCS on 5 August 2015. Norway lodged a partial submission on 27 November 2006, which covers a relatively small area to the north of the Svalbard archipelago. On 30 March 2009 the CLCS finalized its considerations of the partial submission and made corresponding recommendations to Norway. On 15 December 2014 Denmark/Greenland submitted a partial submission which covers a relatively large area of the Central Arctic Ocean.

[5] See Preliminary Information concerning the outer limits of the continental shelf of Canada in the Arctic Ocean, which Canada pursuant to SPLOS/Decision 183 submitted to the CLCS on 6 December 2013. <http://www.un.org/depts/los/clcs_new/submissions_files/preliminary/can_pi_en.pdf>.

[6] The United States of America is not a State Party to UNCLOS but is undertaking the collection of data and information with a view to document claimed entitlement to the areas of interest. See <http://www.continentalshelf.gov/>. This article will not discuss the question whether art 76 reflects customary international law. Yet, it should be noted that the ICJ has stated that '[t]he Court considers that the definition of the continental shelf set out in Article 76, paragraph 1, of UNCLOS forms part of customary international law'. ICJ, *Territorial and Maritime Dispute (Nicaragua v Colombia)*, Judgment of 18 November 2012, para 118.

[7] ITLOS, *Dispute concerning delimitation of the maritime boundary between Bangladesh and Myanmar in the Bay of Bengal (Bangladesh/Myanmar)*, Judgment of 15 March 2012, para 438.

[8] The proposed outer limits of Denmark/Greenland relating to the Central Arctic Ocean, as these appear in the publicly available data, demonstrate that parts of the Gakkel Ridge is within

because of its geological history the Gakkel Ridge cannot constitute a part of the continental margin of any coastal State whose coast abuts the Central Arctic Ocean.[9] The reason for this appears to be the geological discontinuity between the respective land masses and the Gakkel Ridge, even though ITLOS explicitly determined that the crustal structure of the seabed has no bearing as to whether or not such an area is part of a coastal State's continental margin. In all but one of the recommendations that the CLCS has made, there it has been made clear that the demonstration of natural prolongation is not contingent upon geological parameters. Yet, in one of its most recent recommendations the CLCS has taken a diametrically opposite view. The CLCS appears to require that the demonstration of natural prolongation is not only contingent upon morphological continuity but is also dependent upon geology.[10]

Article 76(4)(b)[11] of UNCLOS supports the understanding that the continental margin relies on bathymetric and morphological parameters and the CLCS practice has developed on this basis. However, Article 76 also provides for an exception to the bathymetric and morphological parameters, as a result of which geological criteria can, on an 'evidence to the contrary'[12] basis, partly determine, as a secondary consideration, the maximum seaward extent of the continental margin.[13] This arises where, because of the geological setting, geological conditions determine the point beyond which the foot of slope—determined according to the evidence to the contrary rule under Article 76(4)(b)—cannot exceed,[14] but which nevertheless may be

the proposed outer limits. See <http://www.un.org/depts/los/clcs_new/submissions_files/dnk76_14/dnk2014_es.pdf>.

[9] R Macnab *et al*. argue that '[o]nly two regions appear to be exempt from this projected jurisdiction: a small area in the Mendeleev Abyssal Plain, and a larger one that encompasses the Gakkel Ridge, an oceanic spreading centre. These will remain a part of the Area, with resources that fall within the jurisdiction of the International Seabed Authority.' R Macnab *et al*., 'Cooperative Preparations for Determining the Outer Limit of the Juridical Continental Shelf in the Arctic Ocean: A Model for Regional Collaboration in Other Parts of the World?' (Spring 2001) *IBRU Boundary and Security Bulletin* 94.

[10] See Recommendations of the Commission on the Limits of the Continental Shelf in regard to the submission made by the Cook Islands in respect of the Manihiki Plateau on 16 April 2009, adopted on 19 August 2016, <http://www.un.org/depts/los/clcs_new/submissions_files/cok23_09/2019_08_19_COM_REC_COK.pdf >.

[11] Art 76(4)(b) of UNCLOS provides '[i]n the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base'.

[12] Excerpt from art 76(4)(b) of UNCLOS.

[13] See point 6.1.9 of the Scientific & Technical Guidelines of the Commission on the Limits of the Continental Shelf (Guidelines) in which it is provided that where the evidence to the contrary rule is applicable, the notions 'natural prolongation' and 'submerged prolongation' in paras 1 and 3 of art 76, respectively 'clarify concepts such as natural prolongation of the land territory to the outer edge of the continental margin in the geological sense of these terms, which require the consideration of tectonics, sedimentology and other aspects of geology'.

[14] In its recommendations to Argentina, the CLCS observed that 'regarding the criteria to be applied for the establishment of a foot of the continental slope based on evidence to the contrary: the base and foot of the continental slope should not be located seaward of the region where the [seaward dipping reflectors] sequence terminates; the base and the foot of the continental slope

further seaward than the foot of slope determined according to the general rule, *ie* at the maximum change of gradient. The approach undertaken by ITLOS appears not to take into consideration the fact that Article 76(4)(b) suggests that geology may be considered in the determination of the maximum seaward extent of the continental margin. As the CLCS stressed in its recommendations to Argentina, one of the premises underlying the exception to the general rule is that the base of slope 'should not be located seaward of the region where the thickness of the crust reduces to typical oceanic crustal values further seaward'.[15] Accordingly, geology indirectly determines the maximum extent of entitlement where reliance is made on the evidence to the contrary rule.

Until recently, it would appear that geological reasons could not as such constitute grounds for disregarding seafloors, such as the Gakkel Ridge, as being a part of the continental margin of relevant coastal States. This would be true in so far as the general rule under Article 76(4)(b) is applicable to the determination of the foot of slope on the Gakkel Ridge, since the point that geological parameters might influence the maximum seaward extent of entitlement due to the exception to the general rule, would not be relevant. Yet, the recent recommendations of the CLCS to the Cook Islands appear to approach this question through a new spectrum. Geology is accorded an essential role in the definition of the continental margin, irrespective of whether or not the base of slope is determined by the general rule under Article 76(4)(b) or whether it is determined according to the evidence to the contrary rule, which is an exception to the general rule.[16]

While geology has been considered has having a secondary role in the determination of the continental margin, geology has a primary role in the application of the depth-based constraint on the outer limit provided for in Article 76(5).[17,18] A coastal State must demonstrate geological continuity

should not be located seaward of the region where the thickness of the crust reduces to typical oceanic crustal values further seaward; and the specific seaward dipping reflector chosen as the "last unequivocally identifiable seaward dipping reflector" at the end of of the [seaward dipping reflector] sequence should be of sufficient coherency and impedience.' Summary of Recommendations of the Commission on the Limits of the Continental Shelf in regard to the submission made by Argentina on 21 April 2009, adopted by the CLCS on 11 March 2016, para 49. <http://www.un.org/depts/los/clcs_new/submissions_files/arg25_09/2016_03_11_COM_SUMREC_ARG.pdf>.

[15] ibid.

[16] Recommendations of the Commission on the Limits of the Continental Shelf in regard to the submission made by the Cook Islands in respect of the Manihiki Plateau on 16 April 2009, para 58.

[17] Art 76(5) of UNCLOS provides: 'The fixed points comprising the line of the outer limits of the continental shelf on the seabed, drawn in accordance with paragraph 4 (a)(i) and (ii), either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.' On this issue see B Kunoy, MV Heinesen and F Mørk, 'Appraisal of Applicable 2,500 m Depth Constraint Lines for the Purposes of the Establishment of the Outer Limits of the Continental Shelf' (2010) 41 ODIL 357–79.

[18] The 100 nm distance line measured from the applicable 2500 metre isobath is referred to as the 'depth constraint'.

between the relevant seafloor high and the land mass if such a seafloor high is to constitute a submarine elevation that is a natural component of the continental margin, this being a condition precedent for applying the depth constraint.[19] If a seafloor high fails to meet the geological continuity requirement it is seen as a submarine ridge, which means that it cannot generate entitlement that exceeds 350 nm from the baselines[20] while on submarine elevations that are natural components of the continental margin, the seaward extent of entitlement can extend far beyond the distance constraint. Most claimed entitlements to an outer continental shelf in the Central Arctic Ocean go beyond the 350 nm distance line from the baselines. Thus, it is crucial for the States abutting the Central Arctic Ocean to document that the relevant seafloor highs are submarine elevations that are natural components of the continental margin. Commentators seem to agree that some seafloor highs in the Central Arctic Ocean share geological characteristics with the respective land masses. It can thus be assumed that if such geological continuity can be demonstrated, the seafloor highs in question may generate entitlements beyond the 350 nm distance line.[21] Yet, even assuming that a State demonstrates that there is a geological affinity with the relevant land mass, does the morphological shaping of the seafloor high have an impact on determining whether the seafloor high is a submarine ridge or whether it is a submarine elevation that is a natural component of the continental margin under Article 76(6) of UNCLOS? That question is critical in determining the permissible seaward extent of the outer continental shelf entitlements because the applicable constraints under Article 76(5) depend on the classification of the seafloor high pursuant to Article 76(6) of UNCLOS. This article will address the apparent legal challenges that underlie the assertions of entitlements to outer continental shelf in the Central Arctic Ocean.[22]

[19] See the recommendations of the CLCS to Australia in which it refused to classify the Williams Ridge (WR) as a submarine elevation that is a natural component of the continental margin. The CLCS stressed that 'the data submitted for the WR seems to give only indirect evidence of its nature and origin and the Commission is of the opinion that the geological origin of the WR still remains unresolved. The Commission therefore questions whether the application of paragraph 7.3.1(b) of the Guidelines is justified in the case of the WR. Therefore the Commission does not consider it justified that the WR is regarded a submarine elevation that is a natural component of the continental margin in the sense of article 76, paragraph 6'. Recommendations of the Commission on the Limits of the Continental Shelf in regard to the Submission made by Australia on 15 November 2004, adopted on 9 April 2008, para 51 <http://www.un.org/depts/los/clcs_new/submissions_files/aus04/Aus_Recommendations_FINAL.pdf>.

[20] The first sentence of art 76(6) of UNCLOS provides: 'On submarine ridges, the outer limit of the continental shelf shall not exceed 350 [M] from the baselines.'

[21] The proposed outer limits of Denmark/Greenland, as these appear in the publicly available data, demonstrate that the claim of outer continental shelf from Greenland extends up to approximately 950 M from the baselines. See <http://www.un.org/depts/los/clcs_new/submissions_files/dnk76_14/dnk2014_es.pdf>.

[22] Coastal States appear vested with a right to block the CLCS from considering a submission from another State with which it has overlapping claims of entitlement. Rule 5(a) of Annex I to the Rules of Procedure of the CLCS provides that '[i]n cases where a land or maritime dispute exists, the Commission shall not consider and qualify a submission made by any of the States concerned in

II. SUBMITTING TO THE CLCS

The CLCS is a treaty body established to make recommendations in accordance with Article 76 of UNCLOS. The CLCS does not make binding decisions but recommendations. Yet, the importance of the work of this treaty body cannot be underestimated; the opposability of a claimed entitlement to an outer continental shelf is contingent upon the coastal State delineating the outer limits of its entitlement on the basis of the CLCS recommendations. The CLCS is not likely to consider the submission of Denmark/Greenland at any time in the foreseeable future.[23] However, the situation is quite different with regard to the consideration of the partial revised submission of Russia of August 2015.[24] A sub-commission has reconvened[25] to consider this submission.

A. The Mandate of the CLCS

The CLCS is composed of 21 members who are experts in the fields of geology, geophysics or hydrography. The members of the CLCS serve in their personal capacities.[26] According to the mandate of the CLCS, it shall consider data and other material submitted by coastal States concerning the outer limits of the

the dispute. However, the Commission may consider one or more submissions in the areas under dispute with prior consent given by all States that are parties to such a dispute.' All the relevant coastal States in the Central Arctic Ocean have notified the United Nations Secretary General that they do not object to the CLCS considering the partial revised submission of Russia of August 3, 2015 (Denmark, United States of America and Canada submitted their respective notes on 7 October 2015, 30 October 2015 and on 30 November 2015; see <http://www.un.org/depts/los/clcs_new/submissions_files/submission_rus_rev1.htm>. Nor do they object to the CLCS considering the submission of Denmark/Greenland of December 15, 2014 (Norway, Canada, the Russian Federation and the United States of America submitted their respective notes on 17 December 2014, 29 December 2014, 21 July 2015 and 30 October 2015; see <http://www.un.org/depts/los/clcs_new/submissions_files/submission_dnk_76_2014.htm>. The entitlement to outer continental shelf stemming from Norway has already been considered by the CLCS. The CLCS approved the claimed entitlement of Norway stemming from the Yermak Plateau.

[23] According to Rule 51(4)(ter) of the Rules of Procedure of the Commission on the Limits of the Continental Shelf (Rules of Procedure) '[t]he submissions shall be queued in the order they are received'. CLCS/40/Rev.1. The submission of Denmark/Greenland is number 76 in the queue. The most recent establishment of a sub-commission relates to the consideration of the submission of the Seychelles concerning the Northern Plateau Region, which is number 39 in the queue.

[24] Notwithstanding the rule that submissions shall be considered in the order they are received, revised submissions shall be 'considered on a priority basis notwithstanding the queue'. Statement by the Chairperson of the Commission on the progress of work in the Commission (CLCS/68) of 17 September 2010, para 57.

[25] According to art 5 of Annex II to UNCLOS, '[u]nless the Commission decides otherwise, the Commission shall function by way of sub-commissions composed of seven members, appointed in a balanced manner taking into account the specific elements of each submission by a coastal State'. The Members of the sub-commission established to consider the partial revised submission of Russia are LF Awosika, G Carrera (Chair), MB Madon, JAR Marques, YA Park (Vice-Chair), WR Roest (Vice-Chair), and S Uścinowicz. See Statement by the Chairman of the Commission on the progress of work in the Commission (CLCS/93) of 18 April 2016, paras 66–68.

[26] See art 2(1) of Annex II to UNCLOS.

continental shelf and 'make recommendations in accordance with article 76'.[27] This duty entrusted to the CLCS implies an obligation to use its best efforts to ensure that the data and other material submitted in support of the 'proposed outer limits'[28] of the continental shelf are in accordance with the relevant provisions of Article 76 of UNCLOS. The term continental shelf under UNCLOS has an autonomous meaning, which differs from its corresponding scientific meaning. This gives rise to the notion that a continental shelf, in international law, is 'a legal concept',[29] which may raise various challenges given the treaty obligation incumbent upon the CLCS to 'make recommendations in accordance with article 76'.[30] Thus, it becomes clear that the fulfilment of the CLCS' mandate cannot be undertaken in clinical isolation to treaty interpretation.[31] The Scientific & Technical Guidelines of the Commission on the Limits of the Continental Shelf[32] (Guidelines) are symptomatic in this regard.

Other than providing guidance on scientific matters, by adopting the Guidelines the CLCS 'aims also to clarify its interpretation of scientific, technical and *legal* terms contained in UNCLOS'.[33] The CLCS sees this as a necessity, as the 'Convention makes use of scientific terms in a legal context which at times departs significantly from accepted scientific definitions and terminology.'[34] Thus 'clarification'[35] is required 'because various terms in the Convention might be left open to several possible and equally acceptable interpretations'.[36] The CLCS adds that by adopting the Guidelines it also seeks to avoid non-harmonious interpretations of the 'various terms in the Convention'.[37] Interpreting a treaty provision can be seen as giving 'a precise definition of the meaning and scope[38] of a legal document. The question of whether, or to what extent, a CLCS 'clarification' constitutes an interpretation of UNCLOS depends on whether the CLCS confers a *precise*

[27] Excerpt of art 3(1)(a) of Annex II to UNCLOS.

[28] Expression used in Rule 47(2) of the Rules of Procedure relating to the claimed seaward extent of entitlement.

[29] ICJ, *Aegean Sea Continental Shelf (Greece v Turkey)*, Judgment on Jurisdiction of 19 December 1978, ICJ Rep 1980, at 36, para 86.

[30] Excerpt from art 3(1)(a) of Annex II to UNCLOS.

[31] D Nelson argues that 'one of the cardinal functions of the Commission must necessarily be to interpret or apply the relevant provisions of the Convention – an essentially legal task'; 'The Continental Shelf: Interplay of Law and Science' in N Ando *et al.* (eds), *Liber Amicorum Judge Shigeru Oda* (Kluwer Law 2002) 1235, 1241. R Wolfrum argues also that 'a competence not referred to in the (Convention) which, nevertheless, is being fulfilled by the Commission is the interpretation, or at least giving guidance, to the interpretation of Article 76 of the Convention'; 'The Role of International Dispute Settlement Institutions in the Delimitation of the Outer Continental Shelf' in R Lagoni and D Vignes (eds), *Maritime Delimitation* (Martinus Nijhoff Publishers 2006) 21, 24.

[32] CLCS/11, Scientific & Technical Guidelines of the Commission on the Limits of the Continental Shelf, adopted on 13 May 1999.

[33] ibid, point 1.3 (emphasis added).

[34] ibid.

[35] ibid.

[36] ibid.

[37] ibid.

[38] PCIJ, *Interpretation of Judgments Nos 7 and 8 (The Chorzów Factory)*, Judgment of 16 December 1927, Ser A, No 13, 10.

definition of the meaning and scope upon Article 76 of UNCLOS, which, as noted above, it does. Matters relating to the constitutive criteria of submarine elevations[39] and submarine ridges[40] are given ample consideration in the Guidelines, and thus these notions are among those the CLCS has sought to 'clarify'.[41] The CLCS did so in order to ensure that the application and interpretation of these terms is not being 'left open to several […] interpretations'.[42] The determination of the scope of these notions is important for purposes of demonstrating entitlement to an outer continental shelf in the Central Arctic Ocean because the submissions that are transmitted to the CLCS depend on the classification of the seafloor highs that fall within the above-mentioned categories.

B. The Outcome of the Work of the CLCS

Coastal States have inherent rights to the continental shelf that 'do not depend on occupation, effective or notional, or on any express proclamation'.[43] According to Article 4 of Annex II to UNCLOS, where a coastal State intends to establish the outer limits of its continental shelf beyond 200 nm 'it shall submit particulars of such limits to the Commission along with supporting scientific and technical data'.[44] This obligation is of a procedural nature.[45] It follows that entitlements to the continental shelf do not depend on any 'procedural requirements'.[46] Nonetheless, the fulfilment of this procedural obligation has a substantive outcome. Some authors have argued that although the process results in recommendations, it is highly unlikely that States will be able to cast aside such recommendations and establish opposable outer limits further seaward than the limits that correspond to such CLCS recommendations.[47] As the ITLOS observed in the *Bay of Bengal* case, only outer limits that are established on the basis of the recommendations of the CLCS are opposable under international law.[48] Such opposability does not

[39] Point 7.3.1 of the Guidelines sets out considerations that are taken into account in the classification of a seafloor high constituting a submarine elevation that is a natural component of the continental margin under para 6 of art 76.

[40] Point 7.2 of the Guidelines sets out a non-exhaustive list of criteria that is meant to guide States to distinguish between 'submarine ridges' under para 6 of art 76 and 'oceanic ridges' under para 3 of art 76.

[41] Point 1.3 of the Guidelines.

[42] ibid, point 1.3.

[43] Art 77(3) of UNCLOS.

[44] Excerpt from art 4 of Annex II to UNCLOS.

[45] ITLOS, *Bay of Bengal*, para 407.

[46] ibid, para 408.

[47] L Lucchini argues that although it is only the coastal State that establishes the outer limits of the continental shelf 'il doit, en revanche, le faire sur la base des recommandations émises par la Commission'; 'La delimitation des Frontiéres Maritimes dans la Jurisprudence Internationale: Vue dEnsemble' in R Lagoni and D Vignes (eds), *Maritime Delimitation* (Koninklijke Brill 2006) 3, 15. See also E Jarmache for a similar opinion; 'À propos de la Commission' (2006) 11 Annuaire du droit de la mer 67.

[48] In the *Bay of Bengal*, ITLOS held that 'the opposability with regard to other States of the limits thus established depends upon satisfaction of the requirements specified in article 76, in particular compliance by the coastal State with the obligation to submit to the Commission information on the limits of the continental shelf beyond 200 [M] and issuance by the

mean that the recommendations made by the CLCS become decisions but it does mean that not only the Guidelines, but also the recommendations of the CLCS have normative characteristics.

It is important to note that Article 76(8) of UNCLOS does not oblige States to base their outer limits of the continental shelf on the basis of the recommendations of the CLCS.[49] Rather, it provides that the outer limits established on such a basis shall be final and binding.[50] This raises the question of how the second phrase in Article 76(8) is to be interpreted if States are free to disregard the recommendations of the CLCS. Indeed, Article 8 of Annex II to UNCLOS gives support to the understanding that submitting coastal States are not free to disregard the recommendations of the CLCS.[51] Since the opposability of outer limits is contingent upon their being based on the recommendations of the CLCS, there is no presumption of conformity with Article 76 of UNCLOS should a coastal State establish outer limits that go further seaward than those recommended by the CLCS. For these reasons, submitting coastal States are inclined to align their understandings of Article 76, and of the Guidelines, to that of the CLCS, as

Commission of relevant recommendations in this regard. It is only after the limits are established by the coastal State on the basis of the recommendations of the [CLCS] that these limits become "final and binding".' ITLOS, *Bay of Bengal*, para 408. In a note prepared by the DOALOS Secretariat, and which was transmitted to the consideration of States Parties to UNCLOS, during their Meeting of States Parties, it is correctly observed, that '[f]or a State to include in its national legislation the general phrase that its continental shelf extends to the outer edge of the continental margin might sound legally correct, but it does not locate the exact position of that outer edge which would be *internationally recognized only when considered and recommended by the Commission*, accepted by the State, and then incorporated into its national legislation'. SPLOS/64, *Issues with respect to article 4 of Annex II to the United Nations Convention on the Law of the Sea – Background paper prepared by the Secretariat* (1 May 2001) para 44 (emphasis added). See also Judge Rüdiger Wolfrum, who has described the function of the CLCS as one akin to a legitimator; 'The Delimitation of the Outer Continental Shelf: Procedural Considerations' in R Badinter and JP Cot (eds), *Liber Amicorum Jean-Pierre Cot – Le procès international* (Bruylant 2009) 249, 251. In an article from 1989, similar views were expressed by Tullio Treves: 'il est difficile d'imaginer comment les critères des paragraphes de l'article 76 qui suivent le premier pourraient être appliqués de manière opposable aux autres Etats … sans la sanction d'un organisme technique international indépendant, tel que la Commission des limites du plateau continental'; 'La limite extérieure du plateau continental: Évolution récente de la pratique' (1989) 35 AFDI 725, 734.

[49] According to art 76(8) of UNCLOS, the outer limits of the continental that are established 'on the basis of these recommendations shall be final and binding'. B Oxman argues that by virtue of the last sentence in art 76(8) of the Convention, submitting coastal States have been granted 'an extraordinary power nowhere reproduced with respect to any other maritime limit … They may not be contested.'; 'The Third United Nations Convention on the Law of the Sea: The Ninth Session (1980)' (1981) 75 AJIL 221, 230.

[50] Oxman argues that a submitting coastal State 'is not denied the right to reject the recommendations of the Commission'; see (n 49) 230.

[51] Art 8 of Annex II to UNCLOS provides that '[i]n the case of disagreement by the coastal State with the recommendations of the Commission, the coastal State shall, within a reasonable time, make a revised or new submission to the Commission'. Yet, it has been observed elsewhere that '[a] continental shelf boundary that has not been established on the basis of the recommendations of the Commission may still become final and binding in the sense of Article 76(8), depending on the further actions of the coastal State and other States'. First Report of the International Law Association Committee established to study the outer continental shelf (2004) 23 fn 111.

expressed in its recommendations to them. The recommendations of the CLCS to Japan are of particular interest in this regard. The CLCS recognized that it attaches much importance to its practice for ensuring consistency in its recommendations. By refusing to accept that the Minami-Tori Shima Seamount Group was a submerged prolongation of Japan, the CLCS stressed that its opinion was 'consistent with the views presented in previous recommendations'.[52] Thus, while not being able to constitute a *jurisprudence constante*,[53] it is clear that the CLCS seeks to establish a practice which it relies on in order to justify its positions and on which coastal States can be expected to base their submissions in order to ensure opposable outer limits of the continental shelf.

Every submission to the CLCS is considered on its own merits. Yet, it is fair to assume that the recommendations to one coastal State abutting the Central Arctic Ocean may have a bearing on the submissions of the other States that have overlapping claims to the area but whose submissions are further back in the queue, in so far as the claim is based on the same seafloor highs. Given this background, it is reasonable to assert that the recommendations the CLCS makes to coastal States in the Central Arctic Ocean are capable of playing a role in assertions of entitlement for all of the coastal States in the Central Arctic Ocean.

III. SUBMARINE RIDGES

States gave due consideration to the possibility that ridges could generate entitlements far beyond the 200 nm distance line during the Third United Nations Conference on the Law of the Sea (Conference). It was one of the particularly contentious issues. Some States feared that such narrow elongated features could vest States with unreasonably expansive entitlements to the detriment of the Area.[54] Article 76 appears silent as to the distinction between submarine ridges and oceanic ridges. While the understanding of these notions is clearer today, some aspects regarding the composite elements of submarine ridges appear unsettled, including the

[52] Summary of Recommendations of 19 April 2012 to Japan with regard to its submission of 12 November 2008, para 135 <http://www.un.org/depts/los/clcs_new/submissions_files/jpn08/com_sumrec_jpn_fin.pdf>.

[53] AM Mantuano notes that '[p]arler de jurisprudence n'est donc pas approprié dans ce contexte puisque la Commission n'est pas un organe établi pour juger mais pour analyser et évaluer les données présentées par l'Etat demandeur afin de s'assurer qu'elles sont conformes aux critères contenus à l´Article 76'; 'Les travaux de la Commission des limites du plateau continental' in *Le plateau continental étendu aux termes de la Convention des Nations Unies sur le droit de la Mer du 10 décembre 1982: optimisation de la demande* (Pedone 2004) 399, 403.

[54] On this issue see M Voelcker, 'Qu'est qu'une "dorsale" au sens de l'article 76 de la Convention de 1982 sur le droit de la mer? Quelques remarques et commentaires à propos des revendications sur le plateau continental arctique' in R Casado Raigon and G Cataldi (eds), *L´évolution et l'état actuel du droit international de la mer. Mélanges de droit de la mer offerts à Daniel Vignes* (Bruylant 2009) 949–78.

question whether active oceanic-spreading ridges can be considered a 'submerged prolongation of the land mass'[55] of coastal States whose land mass is composed of continental crust.

A. General Considerations regarding Submarine Ridges

Article 76 embodies two different categories of ridges, which are the result of lengthy discussions during the Conference. The crux of the matter is whether the crustal structure of the subsoil is relevant to whether a ridge-like feature falls within the definition of the continental margin in Article 76(3) of UNCLOS.

1. Definition of continental margin

An important point often overlooked is that the Geneva Convention on the Continental Shelf (Geneva Convention)[56] did not define the continental margin. This omission was the principal cause of the disarray that followed the unfortunate inclusion of the alternative definitions of the continental shelf under Article 1 of the Geneva Convention.[57] The omission of any reference to the continental margin created significant ambiguity over whether geology[58] could constrain an otherwise infinite seaward extent of entitlement according to the exploitability criterion.[59] If it could, the exploitability criterion would have geological boundaries, and thereby imply an inherent constraint on the seaward extent of entitlement pursuant to this criterion.[60]

After lengthy negotiations, one of the significant achievements of the Conference was the consensus around the definition of the notion of continental margin.[61] The definition of the continental margin contained in Article 76(3) of UNCLOS is based on three distinct features: (i) the shelf, (ii) the slope and (iii) the rise; all of which constitutes the submerged prolongation

[55] Excerpt from art 76(3) of UNCLOS.

[56] UNTS No 7302, vol. 499, 312–321.

[57] Art 1(a) of the Geneva Convention provides: 'For the purpose of these articles, the term "continental shelf" is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.'

[58] In his dissenting opinion in the *North Sea* cases, *ad hoc* Judge Sørensen held that '[t]he legal concept of the continental shelf cannot reasonably be understood, even in its widest connotation, as extending far beyond the geological concept'. Dissenting Opinion of ad hoc Judge M Sørensen, *North Sea Continental Shelf* cases, Germany / Denmark Germany / The Netherlands, ICJ Rep 1969, at 249.

[59] W Friedmann observed that the inclusion of the exploitability criterion in art 1(a) of the Geneva Convention 'left the limits of national jurisdiction open'; 'Selden Redivivus – Towards a Partition of the Seas' (1969) 63 AJIL 753, 759.

[60] See L Henkin, 'International Law and the "Interests": The Law of the Seabed' (1969) 63 AJIL 504–10.

[61] Art 76(3) provides: 'The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.'

of the land mass of the relevant coastal State. These are morphological features, which may be linked to any land mass. It was an apparently deliberate choice to exclude any reference to crustal structure as a composite element of the continental margin.[62] Accordingly, the definition of the continental margin in paragraph 3 is a juridical definition. In this regard, it is important to have in mind that paragraph 4 relies on some of the morphological composite elements that constitute the continental margin, as defined in paragraph 3. Paragraph 4 is an operative paragraph that determines the outer edge of the continental margin and operates notwithstanding the crustal structure of the seabed and subsoil.

During the Conference, a critical question was whether elongated ridge-like features were capable of generating entitlements beyond the 200 nm distance line from the baselines. In the first revision of the Informal Composite Negotiating Text, the precursor of Article 76(3) did not include any reference to oceanic ridges. Yet, the paragraph was followed with a footnote reference which provided that 'general understanding had been reached to the effect that on the question of *underwater oceanic ridges* there will be additional discussion and that a mutually acceptable formulation to be included in article 76 will be drawn up'.[63] The matter was further discussed during the eighth session of the Conference. Several proposals sought to limit the outer limits of the continental shelf to a 350 nm distance line from the baselines where the seafloor high shared morphological characteristics of a ridge-like feature.[64] The compromise crystallized during the ninth session. This not only led to the current formulation of paragraph 3 but also to the inclusion of a paragraph 5 *bis* of Article 76.[65] The notion of 'underwater oceanic ridges', to which the first revision of the Informal Composite Negotiating Text referred, was bifurcated into two separate categories. On the one hand, the result was a reference to 'the deep ocean floor with its oceanic ridges' in the second sentence in paragraph 3. On the other hand, the term 'submarine ridges' appeared in the new paragraph 6 of Article 76.[66] Neither paragraph refers explicitly to the crustal nature of these features, but the retention of the term 'oceanic ridges' in the second sentence of paragraph 3 of Article 76[67]

[62] H Brekke and P Symonds, 'The Ridge Provisions of Article 76 of the UN Convention on the Law of the Sea' in MH Nordquist (ed), *Legal and Scientific Aspects of Continental Shelf Limits* (Martinus Nijhoff Publishers 2004) 169.

[63] Doc A/CONF.62/WP.10/Rev.1 (emphasis added).

[64] For a general view see MH Nordquist (ed), *United Nations Convention on the Law of the Sea 1982: A Commentary*, vol II (Martinus Nijhoff Publishers 1989) 867– 70.

[65] Doc A/CONF.62/WP.10/REV.3.

[66] Art 76(6) of UNCLOS provides: 'Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.'

[67] Yet, see Brekke and Symonds who advocate that the definition of the continental margin is 'apparently by a deliberate choice, made with no reference to geological crustal types in the sense of

could suggest that crustal structure could matter for determining which features are parts of the continental margin. However, the second sentence of paragraph 3 in conjunction with the first sentence of paragraph 6 are symptomatic of the painstaking compromises that result in treaty provisions becoming 'disagreement[s] reduced to writing'.[68] As the CLCS Guidelines point out, paragraphs 3 and 6 of Article 76 'may create some difficulties in defining ridges for which the criterion of 350 nm in paragraph 6 may apply on the basis of the origin of the ridges and their composition'.[69] While the records of the Conference meetings can set out the compromise that was reached among the participants, they are unable to shed light on what it meant, as the compromises were reached in closed groups.[70] Therefore, they are inapposite as supplementary treaty interpretative means.[71] The legislative history of paragraphs 3 and 6 are interrelated but it appears clear from the ordinary meaning of the first sentence of paragraph 6 that the restriction on submarine ridges[72] is not an exception to paragraph 3 of Article 76 but an exception to Article 76(5) only. Thus, while it is generally accepted that customary treaty interpretation principles provide that an exception to a rule should not lend itself to an extensive interpretation,[73] the first sentence of paragraph 6 is not an exception to paragraph 3 of Article 76. Accordingly, the above-mentioned customary treaty interpretation principle cannot be construed to support that an argument that 'submarine ridges' in paragraph 6 of Article 76 is to be given a restrictive meaning by referring to the idea of 'oceanic ridges'[74] in the second sentence of paragraph 3 of Article 76.

2. *The general rule contained in UNCLOS*

The second sentence of UNCLOS's definition of the continental margin, contained in Article 76(3), provides that the margin 'does not include the deep ocean floor with its oceanic ridges or the subsoil thereof'.[75] At first sight, it would appear that this refers to the crustal structure, yet as mentioned

"continental crust" and "oceanic crust", but with reference to a geologically unspecified "land mass"'. See 'The Ridge Provisions of Article 76 of the UN Convention on the Law of the Sea' (n 62) 180.

[68] P Allott, 'The concept of international law' (1999) 10 EJIL 31, 43.

[69] Guidelines, point 7.2.6.

[70] See M Voelcker, 'Qu'est qu'une "dorsale" au sens de l'article 76 de la Convention de 1982 sur le droit de la mer? Quelques remarques et commentaires à propos des revendications sur le plateau continental arctique'; see (n 54) 954. See also comments of Singapore criticizing that not only was the new paragraph 5 *bis* vague, but it was also agreed 'à huis clos' to the exclusion of several Participants. Doc Off. vol. XIII, at 12, para 16.

[71] See art 32 of the Vienna Convention on the Law of the Treaties. Concluded at Vienna on 23 May 1969, UNTS, vol. 1155, 1-18232.

[72] The first sentence of para 6 of art 76 provides: 'Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 [M] from the baselines from which the breadth of the territorial sea is measured.'

[73] PCIJ, *Nationality Decrees Issued in Tunis and Morocco*, Advisory Opinion of 7 February 1923, Ser. B 4, at 25.

[74] Excerpt from art 76(3) of UNCLOS.

[75] ibid.

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earlier the drafters deliberately decided to exclude crustal structure as a constitutive criterion of the continental margin under paragraph 3 of Article 76.[76] This is also clearly reflected in the ITLOS decision in the *Bay of Bengal* case in which it emphasized that it 'cannot accept Bangladesh's contention that, by reason of the significant geological discontinuity dividing the Burma plate from the Indian plate, Myanmar is not entitled to a continental shelf beyond 200 [nm]'.[77] This does not mean that geological discontinuities are immaterial for the purpose of attributing an ordinary meaning to the notion 'oceanic ridges' in the second sentence of paragraph 3, by contrast to the notion of 'submarine ridges' in paragraph 6,[78] and which are mutually exclusive. One such question is whether the presence of a continental-oceanic transition (COT) on a ridge makes such a seafloor high a part of the deep ocean floor with its oceanic ridges and therefore part of the Area.

Answering this question in the abstract would, however, disregard paragraph 4(b) of Article 76, which provides that '[i]n the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base'.[79] The latter part of this provision provides a morphological and bathymetric formula to identify the maximum change in the gradient at which the foot of the continental slope is determined. The formula constitutes 'a general rule'.[80] The determination of such foot of slope points is preceded by the identification of a common envelope of the base of slope, as paragraph 4(b) of Article 76 states that the foot of the slope is to be determined 'at [the] base'[81] of the slope. Thus the base of slope within which the foot of slope is determined can be identified according to a mere morphological and bathymetric analysis, where it may be 'clearly determined'[82] on such evidence alone. Geological and geophysical data may supplement the morphological and bathymetric data to identify the base of slope. The latter are only required when the morphologic and bathymetric data are insufficient to determine the base of slope and its associated foot of slope points. Consequently, as the base of slope may be determined exclusively according to a morphological and bathymetric analysis, there is no

[76] art 76(3) of UNCLOS defines the continental margin as the submerged prolongation of the land mass of the coastal State. This paragraph operates notwithstanding whether the crustal structure of the seafloor high is of oceanic or continental structure. In point 7.2.9 of the Guidelines the CLCS has noted that para 3 of art 76 of UNCLOS is based on a principle of crustal neutrality: 'The terms "land mass" and "land territory" are both neutral terms with regard to crustal types in the geological sense. Therefore, the Commission feels that geological crust types cannot be the sole qualifier in the classification of ridges and elevations of the sea floor into the legal categories of paragraph 6 of article 76, even in the case of island States.'

[77] ITLOS, *Bay of Bengal*, para 438.

[78] In point 7.2.6 of the Guidelines, the CLCS notes that it 'feels that the provisions of paragraphs 3 and 6 may create some difficulties in defining ridges for which the criterion of 350 M in paragraph 6 may apply on the basis of the origin of the ridges and their composition'.

[79] Excerpt from art 76(4)(b) of UNCLOS.

[80] Excerpt from point 5.1.3 of the Guidelines.

[81] Excerpt from art 76(4)(b) of UNCLOS.

[82] Excerpt from point 5.4.6 of the Guidelines.

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requirement to determine whether a COT is located on a ridge-like feature.[83] This follows directly from the first sentence of Article 76(3), which as mentioned earlier not only omits any reference to crustal structure as a composite element of the continental margin but relies exclusively on morphological features in its definition. As has been observed elsewhere, 'when paragraph 4 [of Article 76] refers to the continental slope and the foot of the continental slope, it is with reference to the continental margin in the sense of the [UNCLOS]. The consequence is that any kind of landmass (irrespective of crustal type) may generate a continental margin in the sense of [UNCLOS] that can be delineated in accordance with paragraph 4 of article 76'.[84] Given this background, it may be concluded that the crustal structure of the seabed has no constitutive role in determining the continental margin where the base of slope may be identified pursuant to a morphological and bathymetric analysis alone.

Geology and geophysics may nevertheless have importance for the purposes of determining the continental margin where the 'evidence to the contrary'[85] rule is invoked. The evidence to the contrary rule provides an alternative formula for determining the foot of slope by allowing for geological evidence to substitute for the general rule in cases where morphological and bathymetric data do not provide a sufficiently accurate foot of slope point.[86] The Guidelines provide a non-exhaustive list of geological parameters to identify the foot of slope that are determined according to the evidence to the contrary rule. These parameters depend on the nature of the continental margins.[87] It appears that the landward limit of the COT 'might be considered by the [CLCS] as an equivalent of the foot of the continental slope in the context of

[83] Geology appears to be attributed a subsidiary role where the geomorphological and morphological analysis used to identify a continuous base of slope region does not provide a seafloor high that can be considered an integral part of the continental margin. In its recommendations to Japan on its submission of 12 November 2008, the CLCS noted that the morphological continuity around the southern tip of the Oki-Daito Rise was too tenuous to be considered sufficient for this seafloor high to be considered a part of the submerged prolongation of the land mass of Japan. Rather than refusing to admit its inclusion in the continental margin on the above-mentioned grounds, the CLCS accepted that geological evidence could be dispositive: 'In order for the Subcommission to consider that a feature with such a tenuous morphological continuity across a saddle as in the case of the "southern tip of the Oki-Daito Rise" would represent part of the submerged prolongation of the mass of a State, the continuity would have to be supported by the existence of geological continuity.' Summary of Recommendations of CLCS to Japan, para 135.

[84] Brekke and Symonds (n 62) 182.

[85] Excerpt from art 76(4)(b) of UNCLOS.

[86] The Guidelines provide that the CLCS 'interprets this provision as an opportunity for coastal States to use the best geological and geophysical evidence available to them to locate the foot of the continental slope at its base when the geomorphological evidence given by the maximum change in the gradient as a general rule does not or can not locate reliably the foot of the continental slope'. Excerpt from point 6.1.10 of the Guidelines.

[87] The Guidelines provide in point 6.2.6 three examples: (a) convergent (active) continental margins; (b) rifted (non-volcanic) and sheared continental margins; and (c) rifted volcanic continental margins, to which guidance is provided for identifying alternative foot of slope points.

paragraph 4'[88] in so far as concerns some continental margins.[89] However, as has been rightly observed by the CLCS, the evidence to the contrary rule has 'the character of an exception'[90] to the general rule. Thus, it is subsidiary in nature and does not alter the general rule for determining whether a feature is part of the continental margin based on morphology and bathymetry. From this background it can be concluded that any feature which is landward of the foot of slope is part of the continental margin, notwithstanding geological settings.

This is reflected in numerous recommendations of the CLCS and in the so-called test of appurtenance, applied by the CLCS.[91] In its recommendations to Barbados, the CLCS failed completely to analyse the geological setting to determine whether the seafloor highs in question were capable of generating entitlement beyond 200 nm. It limited itself to observing that '[f]rom a morphological point of view, the seabed features in the vicinity of the Barbados submerged prolongation … can be considered as natural prolongations of the Barbados landmass'.[92] In its recommendations to New Zealand the CLCS determined on a morphological basis that the Fantail Terrace was part of the Three King Ridge and as such it was acceptable for it to generate outer edge points of the continental margin pursuant to either of the formulae under Article 76(4)(a) of UNCLOS. The CLCS held that 'the location of the base of the continental slope, i.e. the transition from the slope to the deep ocean floor of the South Fiji Basin is identified on a morphological basis, recognising that the Fantail Terrace is an integral part of the Three King Ridge System. Accordingly, the eastern flank of the Three King Ridge may be readily delineated by its foot of the continental slope envelope'.[93] Further, in its recommendations to Japan, the CLCS refused on the basis of an entirely morphological analysis to accept that the Mogi Seamount Region was part of the continental margin of Japan: 'In the Mogi Seamount Region

[88] Excerpt from point 6.3.11 of the Guidelines.

[89] The Guidelines provide in points 6.3.10 and 6.3.11 that in so far concerns (i) rifted (non-volcanic) and sheared continental margins, and (ii) rifted volcanic continental margins the equivalent FOS can be located at the landward limit of the COT. The Guidelines provide in point 6.3.7 that in so far concerns convergent active margins, the equivalent FOS can with 'acceptable accuracy' be determined at the 'seaward limit of the plate boundary'.

[90] CLCS/11, point 6.1.9.

[91] Point 2.2.8 of the Guidelines provides that '[t]he formulation of the test of appurtenance can be described as follows: If either the line delineated at a distance of 60 [nm] from the foot of the continental slope, or the line delineated at a distance where the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of slope, or both, extend beyond 200 [nm] from the baselines from which the breadth of the territorial sea is measured, then a coastal State is entitled to delineate the outer limits of the continental shelf as prescribed by the provisions contained in article 76, paragraphs 4 to 10.'

[92] Summary of Recommendations of the Commission on the Limits of the Continental Shelf in regard to the submission made by Barbados on 8 May 2008, adopted by CLCS on 15 April 2010, para 11; see <http://www.un.org/depts/los/clcs_new/submissions_files/brb08/brb08_summary_recommendations.pdf >.

[93] Recommendations of the CLCS to New Zealand with regard to its partial submission of 19 April 2006, adopted on 22 August 2008, para 138; see <http://www.un.org/depts/los/clcs_new/submissions_files/nzl06/nzl_summary_of_recommendations.pdf>.

the saddle area is not significant enough to create morphological continuity between the Mogi Seamount and the Izu-Ogasawara Arc. *Therefore* the Subcommission agreed that the Mogi Seamount is not regarded as a part of the continental margin of Japan in the sense of Article 76.'[94] Indeed, among the 26 recommendations that the CLCS has made thus far, the demonstration of the submerged prolongation of the land mass beyond 200 nm is not, except in one case, made contingent upon the demonstration of geological links with the land mass.

In the recommendations to the Cook Islands, the CLCS seeks blatantly to reverse its understanding of Article 76(3). It seeks to introduce a geological requirement in addition to the morphological and bathymetric requirements for the purposes of demonstrating that the submerged prolongation of the land mass extends beyond the 200 nm distance line. The CLCS observed, *inter alia*, that the 'key questions relating to natural prolongation' includes whether 'natural prolongation [can] be ensured morphologically and geologically from the islands to the base of the continental slope proposed in the Submission'.[95] Thus, despite admitting morphological continuity with the land mass, the CLCS refused to accept that parts of relevant seafloor highs were integral parts of the continental margin because of the failure to demonstrate geological continuity. The CLCS held that 'only those seafloor highs for which a morphological and geological connection to the High Plateau could be clearly demonstrated should be considered part of the continental margin of the Cook Islands'.[96] It appears to rely on the notion 'natural prolongation', which relates to paragraph 1 of Article 76, to add the supplementary geological requirements in the application of paragraph 3 of Article 76. According to the CLCS, 'due to the lack of conclusive geological and geophysical data and information, and the resulting uncertainties in the tectonic hypotheses, the Subcommission found that there was limited geological and geophysical support to *substantiate the natural prolongation* of the landmass beyond the High Plateau'.[97] The above clearly stands in contrast to the firm view expressed by ITLOS in the *Bay of Bengal* case according to which it 'finds it difficult to accept that natural prolongation referred to in Article 76, paragraph 1, constitutes a separate and independent criterion a coastal State must satisfy in order to be entitled a continental shelf beyond 200 [nm]'.[98] This arises as the CLCS appears to attach criteria to paragraph 1 of Article 76 with a view to determining whether entitlement to the continental shelf extends beyond the 200 nm distance line notwithstanding the subsequent provisions in Article 76 of UNCLOS. Thus, when holding that 'there was limited geological and geophysical support to substantiate the natural prolongation of the

[94] Summary of Recommendations of CLCS to Japan, para 77 (emphasis added).
[95] Summary of Recommendations of CLCS to Cook Islands, para 53.
[96] ibid para 58.
[97] ibid para 80 (emphasis added).
[98] ITLOS, *Bay of Bengal*, para 435.

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landmass'[99] of the Cook Islands it appears that the CLCS is attributing a separate and autonomous meaning to the notion 'natural prolongation' in Article 76(1) of UNCLOS. Yet, as stressed by ITLOS in the *Bay of Bengal* case the concept natural prolongation 'should be understood in light of the subsequent provisions … Entitlement to a continental shelf beyond 200 [nm] should thus be determined by reference to the outer edge of the continental margin, to be ascertained in accordance with article 76, paragraph 4.'[100]

The conclusions of the CLCS with regard to the submission of the Cook Islands may potentially impact the understanding of whether some parts of the Central Arctic Ocean can rightly be claimed to constitute natural prolongations of the land terrirtories of the respective coastal State(s). Yet, it is difficult to draw firm conclusions from this single document, not least because it is quite clear that the CLCS has come to diametrically opposite conclusions when considering other submissions. In any event, and leaving aside the fact that variable understandings of Article 76 may prejudice the careful balancing which resulted in Article 76 and Annex II to UNCLOS, given that the mandate of the CLCS is to make recommendations in accordance with Article 76, the function of the CLCS, to the same extent as that of international courts and arbitral tribunals, 'is to make use of geology only so far as required for the application of international law'.[101]

B. Submarine Ridges in the Central Arctic Ocean

Once it is determined that a seafloor high is part of the continental margin, it is clear that such a feature cannot constitute an oceanic ridge within the meaning of the second sentence of Article 76(3). It follows accordingly that the seafloor high is a submarine ridge or a submarine elevation that is a natural component of the continental margin. According to publicly available data, the relevant coastal States appear to consider the seafloor highs in the Central Arctic Ocean to be submarine elevations that are natural components of the respective continental margins, with the exception of the Gakkel Ridge. Thus, only the Gakkel Ridge is considered as falling exclusively within the ambit of the 350 nm distance constraint in Article 76(5) of UNCLOS.

1. The refusal to exclude seafloor highs on geological grounds

All coastal States in the Central Arctic Ocean transmitted diplomatic notes upon the transmission of the submission of Russia to the CLCS on 20 December

[99] Recommendations of the Commission on the Limits of the Continental Shelf to the Cook Islands, para 58.
[100] ITLOS, *Bay of Bengal*, para 438.
[101] ICJ, *Case concerning the Continental Shelf (Tunisia / Libyan Arab Jamahiriya)*, Judgment of 24 February 1982, ICJ Rep 1982, at 54, para 61.

2001.[102] Yet, it was the diplomatic note of the United States to the United Nations Under-Secretary-General for Legal Affairs on 18 March 2002, in response to the submission of Russia, which was the most notable.[103] It questioned the basis of the methodologies used by Russia with regard to its claimed entitlement to an outer continental shelf in the Central Arctic Ocean. Some of the issues raised by the United States are relevant to whether ridge-like features in the Central Arctic Ocean are composite elements of the continental margins of the coastal States whose coasts abut the Central Arctic Ocean.

It appears from publicly available information that Russia considers the Alpha-Mendeleev Ridge System to be a submarine elevation that is a natural component of its continental margin. The United States diplomatic note appeared to obfuscate the distinction between submarine elevations that are natural components of the continental margin on the one hand with submarine ridges on the other when contending that the Alpha-Mendeleev Ridge System 'is not part of any State's continental shelf'.[104] As explained above the determination of continental margins under Article 76(3) is essentially a morphological and bathymetric exercise. The identification of a common envelope of the slope, within which the foot of slope is established, determines which seafloor highs belong to the continental margin and, by implication, also determines which seafloor highs that are part of the deep ocean floor and its oceanic ridges. This methodology is carefully described under the test of appurtenance in the Guidelines.[105]

From this background it can be concluded that it is only if the Alpha-Mendeleev Ridge System cannot be included within such a common and continuous envelope of the base of slope that this seafloor high is not to be considered to constitute the submerged prolongation of the land mass of the relevant coastal State. In support of its argument, the United States diplomatic note made an analogous conclusion with regard to the Iceland-

[102] Canada noted that it was 'not in a position to determine whether it agrees with the Russian Federation's Arctic continental shelf submission without the provision of further supporting data to analyse and that Canadás inability to comment at this point should not be interpreted as either agreement or acquiescence by Canada to the Russian Federation's submission'. Note Verbale of Canada of 24 January 2002 to United Nation's Secretary-General, available on the website of DOALOS. In the same vein, Denmark noted that it was 'not able to form an opinion on the Russian submission. A qualified assessment would require more specific data. Such absence of opinion at this moment does not imply Denmark's agreement or acquiescence to the Russian Federation's submission.' Note Verbale of Denmark of 5 February 2002 to the United Nations Secretary-General, available on the website of DOALOS. On the reactions of the neighbouring States see D Comba, 'The Polar Continental Shelf Challenge: Claims and Exploration of Mineral Sea Resources – An Antarctic and Arctic Comparative Analysis' (2009) 20 YIEL 158–87.

[103] Excerpt from the United States diplomatic note, <http://www.un.org/depts/los/clcs_new/submissions_files/rus01/CLCS_01_2001_LOS__USAtext.pdf>.

[104] ibid 2.

[105] Point 2.2.6 of the Guidelines provides that the CLCS 'shall use at all times: the provisions contained in paragraph 4(a)(i) and (ii), defined as the formulae lines, and paragraph 4(b), to determine whether a coastal State is entitled to delineate the outer limits of the continental shelf beyond 200 [M]'.

Faroe Ridge. It provides that '[t]he Alpha-Mendeleev Ridge is identical in origin to the Iceland-Faroe Ridge, an oceanic ridge of volcanic origin of similar thickness and morphology … It is similar in magnetic character to the magnetic anomaly field generated by the oceanic Iceland-Faroe Ridge.'.[106] On these geological and geophysical grounds, the United States concluded that '[t]he Alpha-Mendeleev Ridge is not, therefore, a submerged prolongation of the land mass of Russia'.[107] *A fortiori*, it would follow on that basis that neither the Faroe-Iceland Ridge, nor the Ægir Ridge, which extends in a seaward direction from the Faroe-Iceland Ridge would, because of their volcanic origin, be capable of being classified as integral parts of the continental margin of the Faroe Islands. The above *a fortiori* conclusion would appear relevant irrespective of whether or not a common envelope could be identified around a base of slope region in accordance with the general rule under Article 76(4)(b), *ie* in which only bathymetry and morphology are constitutive elements.

In its recommendations to Denmark, however, the CLCS recognized explicitly that the Faroe-Iceland Ridge, and the Ægir Ridge, notwithstanding their geological discontinuity with the land mass of the Faroe Islands, are integral parts of the continental margin as a common and continuous envelope of the base of slope links these seafloor highs with the land mass of the Faroe Islands. On this basis the seafloor highs are considered as being able to generate entitlement to outer continental shelf. The CLCS referred to the position taken by Denmark, according to which the Ægir Ridge is a submarine ridge within the meaning of the first sentence of Article 76(6). It noted that according to Denmark: 'since the Ægir Ridge is *morphologically* continuous with the continental margin north of the Faroe Islands … yet is an extinct seafloor spreading ridge that is geologically *different* from the landmass of the Faroe Islands, it is a submarine ridge in the meaning of article 76, paragraph 6, of the Convention'.[108] The CLCS then observed that 'it agreed with th[e] view'[109] that the Faroe-Iceland Ridge and its northern extension, the Ægir Ridge, are composite elements of the northern continental margin of the Faroe Islands on the sole ground of morphology, notwithstanding fundamental geological differences with the land mass.

It follows that the data and other documentation presented by Denmark supporting the claim that the Faroe-Iceland Ridge and the Ægir Ridge were composite elements of the continental margin within the meaning of Article 76(3) were approved by the CLCS, notwithstanding their considerable geological discontinuity with the land mass of the Faroe Islands. *A fortiori*,

[106] United States diplomatic note, at 2.

[107] ibid.

[108] Recommendations of the Commission on the Limits of the Continental Shelf to the Kingdom of Denmark with regard to the Partial Submission relating to the Northern Continental Shelf of the Faroe Islands, adopted on 24 March 2014, para 34; <http://www.un.org/depts/los/clcs_new/submissions_files/dnk28_09/2014_03_14_SCDNK_REC_COM_20140521.pdf> (emphasis added).

[109] ibid.

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the fact that 'the Alpha-Mendeleev Ridge System is underlain by unusually homogeneous crust with moderate to high seismic velocities that resemble those measured in the oceanic Iceland-Faroe Ridge'[110] cannot constitute grounds for excluding the Alpha-Mendeleev Ridge System from forming part of the continental margin of the relevant coastal States to the Central Arctic Ocean. On the contrary, it is the location of the continuous base of continental slope region that determines whether the Alpha-Mendeleev Ridge System or any other seafloor high in the Central Arctic Ocean is a part of the coastal States continental margins.

2. A distinct morphological feature

The CLCS recommendations to the United Kingdom in relation to Ascension Island are instructive in relation to the question whether morphological ridge-like features, with different crusts than those of the land mass whose submerged prolongation they represent, are integral parts of the continental margin of the relevant coastal States in the Central Arctic Ocean. As mentioned earlier, the Gakkel Ridge, an active oceanic spreading ridge, is such a feature. In its recommendations to the United Kingdom, the CLCS observed that 'the true oceanic features of the seafloor occur seaward of the continental margin and include both the ocean basin floor and [mid-ocean ridge] zones. This categorisation is reflected in article 76, paragraph 3, of the Convention, which states that the continental margin "*... does not include the deep ocean floor with its oceanic ridges*".'[111]

It would be erroneous to conclude from this that mid-ocean ridges are unable to constitute integral parts of a continental margin. This can arise where the data demonstrates that a seafloor high is morphologically continuous with the land mass, since such a seafloor high cannot be 'seaward of the continental margin'.[112] In order to bolster its position that Ascension Island was entitled to an outer continental shelf, the United Kingdom referred to point 7.2.8[113] of the Guidelines[114] and, it can be assumed, by so doing sought to distinguish this situation from active spreading ridges, which have no islands on them. It appears also that the United Kingdom sought to attach a

[110] United States diplomatic note (n 89) 3.

[111] Summary of Recommendations of the Commission on the Limits of the Continental Shelf in regard to the Submission made by the United Kingdom of Great Britain and Northern Ireland in respect of Ascension Island on 9 May 2008, adopted by the CLCS on 15 April 2010, para 27 (original emphasis) <http://www.un.org/depts/los/clcs_new/submissions_files/gbr08/gbr_asc_isl_rec_summ.pdf>.

[112] ibid para 75.

[113] Point 7.2.8 of the Guidelines provides: 'Some ridges (including active spreading ridges) may have islands on them. In such cases it would be difficult to consider that those parts of the ridge belong to the deep ocean floor.'

[114] Summary of Recommendations of the CLCS to the United Kingdom in respect of Ascension Island, para 21(ii).

secondary role to morphology and bathymetry for the purposes of identifying the base of the continental slope. The United Kingdom held that it does

> not regard establishment of the 'natural prolongation' of the land territory as referred to in Article 76 to require a particular 'morphology', or set of morphological features, considered in isolation from other data. The technical arguments for natural prolongation, foot of slope position, base of slope region can all be developed and established through analyses of a range of data, including geology and geophysics, *in addition to* morphology.[115]

It would appear, accordingly, that the United Kingdom sought to reverse the order of the general rule by seeking to attribute a secondary role to morphology. The CLCS refused to accept the approach of the United Kingdom. The CLCS observed further that 'islands surmounting *discrete* morphological features (including ridges) rising from this deep ocean floor are entitled to a "continental margin" and "continental shelf"'.[116] In the case of ridges surmounted by islands the question arises as to which parts of such ridges are of the deep ocean floor, and which parts constitute the continental margin. The CLCS stressed that the guiding criterion for including seafloor highs in the continental margin of a land mass 'depends on the location of the base and the [foot of slope] within the submerged prolongation of those islands. Therefore, the [foot of slope] must be situated more than 140 nm from the territorial sea baselines in order to establish an outer edge of continental margin beyond 200 nm using the 60 nm distance formula'.[117] The CLCS observed that in order for this to be the case for a small oceanic island like the Ascension, 'it would have to surmount a discrete seafloor high, that itself rises above the average "ruggedness" of the deep ocean floor … In the view of the Commission, the data submitted by the United Kingdom does not demonstrate such a situation'.[118] Thus, the CLCS refused to accept the geological arguments by which the United Kingdom sought to extend the base of the continental slope further seaward.[119]

The main reason for not accepting the claimed entitlement of the United Kingdom from Ascension Island relates exclusively to morphology. In the words of the CLCS, 'the existence of a continental slope requires the existence of a distinct morphological feature rising from the level of the continental rise or the deep ocean floor up to the continental shelf of the land mass of the coastal state'.[120] From this background it can be concluded that the recommendations of the CLCS to the United Kingdom, together with the recommendations relating to the Faroe-Iceland Ridge and the Ægir Ridge, constitute benchmarks on the role that the CLCS attaches to morphology for

[115] ibid para 21(i) (emphasis added). [116] ibid para 43. [117] ibid para 44.
[118] ibid. [119] ibid paras 37–38.
[120] Summary of Recommendations of the CLCS to the United Kingdom in respect of Ascension Island, para 23(iii).

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determining the base of slope region.[121] This is an important exercise because it determines whether a seafloor high is part of the continental margin or whether it belongs to the deep ocean floor and its oceanic ridges. The prominent role of morphology and bathymetry has particular relevance for the discussion whether the Gakkel Ridge, an active oceanic spreading ridge, can constitute part of the continental margin of relevant coastal States to the Central Arctic Ocean.

3. Gakkel Ridge

The partial submission by Denmark/Greenland, with regard to the northern continental shelf of Greenland,[122] included within its continental margin an active mid-ocean spreading ridge that runs from the Lena Trough in the Fram Strait to the Laptev shelf of Russia. This elongated narrow seafloor high is denominated the Gakkel Ridge. It is considered the northern prolongation of the Mid-Atlantic Ridge, and connects the Eurasian Basin and the North Atlantic. Due to its geological origin and its nature as an active oceanic spreading ridge with limited geological affinity with the neighbouring land masses, it has been considered a classic example of a seafloor high that belongs to the 'deep ocean floor with its oceanic ridges'.[123] A former member of the CLCS has noted that '[t]he Gakkel Ridge … is an active ocean spreading ridge that does not seem to connect with any of the continental margins'.[124] Elsewhere, it has been argued that 'consensus has been reached' that the Gakkel Ridge is an oceanic ridge within the meaning of Article 76(3) of UNCLOS and therefore not eligible to generate

[121] CLCS states also that '[t]he United Kingdom regards the rift valley of the spreading axis and the deeps of associated fracture zones as parts of the continental slope of Ascension Island. However, in the view of the Commission, ocean spreading structures, which are normally part of the deep ocean floor, can only form the continental slopes of island landmasses in cases where such structures form part of the discrete seafloor highs from which the island edifices rise. This is not the case for Ascension Island, as its edifice is *not morphologically* connected to any such discrete seafloor high.' ibid para 45 (emphasis added).

[122] Partial Submission of the Government of the Kingdom of Denmark together with the Government of Greenland, submitted to the CLCS on 16 December 2014.

[123] Excerpt from art 76(3) of UNCLOS. J Gao has argued that the '[m]id-ocean ridge is the best example of the oceanic ridges'; 'Continental Shelf beyond 200 Nautical Miles in the Arctic Basin' (2011) 45 Revue Juridique Thémis 722, 730.

[124] H Brekke, 'The limits of the continental shelf in the Arctic Ocean', The Norwegian Scientific Academy for Polar Research, Newsletter, No 12 (2014) <http://polar-academy.com/documents/Newsletter_12-June2014.pdf> 3. Yet, the same author has said elsewhere that 'any morphological seafloor feature around which it is possible to draw a foot of the continental slope, and which is continuous with the foot of the continental slope of the rest of the continental margin, is an integral part of the continental margin under paragraph 4. Therefore, such seafloor features contribute to the outer edge of the continental margin since their foot of the continental slope is eligible to generate an outer edge of margin in accordance with paragraph 4(a)'; see Brekke and Symonds, 'The Ridge Provisions of art 76 of the UN Convention on the Law of the Sea' (n 62) 183.

entitlement to continental shelf beyond 200 nm from the baselines.[125] It has also been observed that only two areas of seabed on the Central Arctic Ocean are beyond national jurisdiction, one of which is the Gakkel Ridge, which 'cannot be included in the continental margin as defined in article 76'.[126] These observations seem to assume that geological factors prevent the Gakkel Ridge from being considered a 'submerged prolongation of the land mass'[127] of the relevant coastal States abutting the Central Arctic Ocean. Yet, the overwhelming practice of the CLCS rightly indicates unambiguously that the general rule is that geology has no constitutive role for identifying the continental margin. The question is, though, whether the same premise applies to active oceanic spreading ridges, which are held to be the submerged prolongation of a land mass whose crustal structure is continental.[128]

The Guidelines provide that '[s]ome ridges (including active spreading ridges) may have islands on them. In such cases it would be difficult to consider that those parts of the ridge belong to the deep ocean floor'.[129] One could argue *a contrario* that the provision above also means that if there are no islands on an active oceanic spreading ridge, it may be difficult to include such seafloor highs within the continental margin, as defined in Article 76(3) of UNCLOS. Yet that understanding would hardly be reconcilable with the ordinary meaning of paragraph 4(b) of Article 76. The latter provision provides a general rule pursuant to which the base of slope is identified according to morphologic and bathymetric data, *ie* geology has no constitutive role for determining the continental margin. To argue the contrary would also neglect the fact that the Ægir Ridge, while not being an active oceanic spreading ridge, but an extinct oceanic spreading ridge, was considered a submerged prolongation of the land mass of the Faroe Islands—despite the absence of any islands sitting upon the ridge. Furthermore, the CLCS noted that the Ægir Ridge was not only an extinct oceanic ridge but also that it had 'created oceanic seafloor beneath the Northern Deep as well as the

[125] Gao argues that 'consensus has also been reached over the legal status of the Gakkel Ridge. The ridge, also known as the Arctic Mid-Ocean Ridge, is a currently active seafloor spreading system. According to paragraph 3 of article 76, the continental margin ''does not include the deep ocean floor with its oceanic ridges or the subsoil thereof''. Mid-ocean ridge is the best example of the oceanic ridges.' Gao (n 123) 730.

[126] AO Elferink, 'The Outer Continental Shelf in the Arctic: The Application of art 76 in the LOS Convention in a Regional Context' in AO Elferink and D Rothwell (eds), *The Law of the Sea and Polar Maritime Delimitation and Jurisdiction* (Martinus Nijhoff Publishers 2001) 138, 155.

[127] Excerpt from art 76(3) of UNCLOS.

[128] The Reykjanes Ridge is an active oceanic spreading ridge. It was considered an integral part of the continental margin of Iceland. By contrast to Iceland, whose land mass is composed of oceanic crust, the land mass of Greenland is composed of continental crust. This difference makes it to some extent inappropriate to refer by way of analogy to the situation of the Reykjanes Ridge, when assessing whether the Gakkel Ridge, an active oceanic spreading ridge, is capable of constituting an integral part of the continental margin of any coastal State whose land mass is composed of continental crust.

[129] Guidelines, point 7.2.8.

Faroe-Iceland Ridge'.[130] As mentioned earlier, the CLCS agreed with Denmark's understanding that the Ægir Ridge is an integral part of the continental margin of the Faroe Islands, notwithstanding the Ægir Ridge being an extinct oceanic seafloor spreading ridge from which there is limited geological affinity with the land mass of the Faroe Islands. Accordingly, it appears that if the general rule under Article 76(4)(b) is applied,[131] geology has no constitutive role to determine whether the Gakkel Ridge, or parts thereof, may be considered an integral part of the northern continental margin of Greenland. This determination is instead contingent upon the demonstration of morphological and bathymetric continuity for the purpose of the geomorphological analysis[132] under point 5.2.1 of the Guidelines.[133]

In light of the CLCS' understanding of the nature of the Ægir Ridge in relation to Article 76, it appears that the inclusion of any seafloor high in the Central Arctic Ocean within the continental margin is principally a matter of morphology and bathymetry. The quintessential exercise relates to determining 'a distinct morphological feature rising from the level of the continental rise or the deep ocean floor up to the continental shelf of the land mass of the coastal state'.[134] Geology has only a secondary role in this regard. Thus, provided the geomorphological analysis[135] demonstrates that the Gakkel Ridge is morphologically continuous with the land mass of Greenland, it appears reasonable to assert that this seafloor high is an integral part of the continental margin of Greenland notwithstanding it being an active oceanic spreading ridge which does not share geological affinity with the land mass of Greenland. The assertion that the Gakkel Ridge can be included in the continental margin of the relevant coastal State(s) solely on the basis of morphologic and bathymetric criteria does not, however, accord with the recommendations of the CLCS to the Cook Islands. In those recommendations the CLCS also required the demonstration of geologic

[130] Recommendations of the CLCS to Denmark with regard to the partial submission relating to the Northern Continental Shelf of the Faroe Islands, para 27.

[131] The geomorphological analysis to identify the base of the slope region under art 76(4)(b) as further developed in point 5.2.1 of the Guidelines has 'the character of a general rule'. Excerpt from point 5.1.3 of the Guidelines.

[132] In its recent recommendations to Iceland the CLCS noted that 'the base and foot of the continental slope in the Ægir Basin area are unambiguously identifiable on a morphological basis [and therefore] fulfill the requirements of article 76 and Chapter 5 of the Guidelines. The Commission recommends that these FOS points form the basis for the establishment of the outer edge of the continental margin in the Ægir Basin area.' Summary of Recommendations of the Commission to Iceland, paras 30–31.

[133] The relevant part of point 5.2.1 of the Guidelines provides: 'Bathymetric and geological data provide the evidence to be used in the geomorphological analysis conducted to identify the region defined as the base of the continental slope.'

[134] Summary of Recommendations of the CLCS to the United Kingdom in respect of Ascension Island, para 23(iii).

[135] According to point 5.4.6 of the Guidelines, the geomorphological analysis can be conducted pursuant to morphology and bathymetry only, where the base of the continental slope can be 'clearly determined' on such evidence alone.

continuity between any seafloor high and the relevant land mass of the coastal State in order for it to constitute a part of a continental margin within the meaning of Article 76(3). However, and has already been noted, this not only stands in contrast to the Guidelines and numerous previous recommendations of the CLCS, but also blatantly challenges the interpretation of Article 76 by ITLOS in the *Bay of Bengal* case.

In any event, it is clear that the Gakkel Ridge cannot constitute a submarine elevation that is a natural component of the continental margin. It shall be demonstrated below that in order for any seafloor high to constitute a submarine elevation that is a natural component of the continental margin, and thus susceptible to the depth constraint, the submitting coastal State must demonstrate geological affinity with the relevant land mass.

IV. SUBMARINE ELEVATIONS THAT ARE NATURAL COMPONENTS OF THE CONTINENTAL MARGIN

In order to establish outer limits that exceed 350 nm from the baselines, the seafloor high generating the entitlement must be a submarine elevation that is a natural component of the continental margin in the meaning of Article 76(6) of UNCLOS. In the Central Arctic Ocean there are two such seafloor highs, which the submitting coastal States appear to consider submarine elevations that are natural components of the continental margin. These are the Lomonosov Ridge and the Alpha-Mendeleev Ridge System.

A. General Considerations regarding Submarine Elevations

The classification of a seafloor high as a submarine elevation that is a natural component of the continental margin can have a significant impact on the seaward extent of entitlement to outer continental shelf areas. It is thus critical for the submitting coastal States to document that the classification of the relevant seafloor highs as submarine elevations that are natural components of the continental margin is substantiated with relevant evidence.

1. The meaning of submarine elevations that are natural components of the continental margin

The concept of 'submarine elevations that are natural components of the continental margin' in the second sentence of Article 76(6) is distinctive in many regards. This notion has a singular legislative history and provides the context for the term 'submarine ridge' in the first sentence of paragraph 6.[136]

[136] The first sentence of paragraph 6 of art 76 reads: 'Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measure.'

The latter was included as a safeguard for those States that feared that in the absence of a reference to a particular crustal type Article 76(3) would result in creeping jurisdiction on mid-Atlantic ridges.[137] The inclusion of the notion 'submarine ridges' in the first sentence of paragraph 6, and the associated rule thereunder, ensured that 'on submarine ridges, the outer limit of the continental shelf shall not exceed 350 [nm]'.[138] This means that submarine ridges are not subject to the alternative depth constraint, whilst is applicable, in addition to the 350 nm distance constraint, to submarine elevations that are natural components of the continental margin. The inclusion of the second sentence in Article 76(6) was also a safeguard for those States with broad continental margins, ensuring that their entitlement could go beyond the 350 nm distance constraint line when the outer edge of the continental margin stems from submarine elevations that are natural components of the continental margin. While the first sentence of Article 76(6) is an exception to paragraph 5, which provides that the outer limits of the continental shelf shall not exceed either the distance or the depth constraints, it is clear that the second sentence of Article 76(6) is not an exception to the first sentence of paragraph 6. Thus, where it is established that the outer edge of the continental margin does not exceed the 350 nm distance line, and where the depth constraint provides a limit that is further landward than the distance constraint, there is no requirement to classify the relevant seafloor highs.[139] This arises as only the first sentence of paragraph 6 is an exception to Article 76(5).

The second sentence of Article 76(6) includes a non-exhaustive list of features that constitute natural components of the continental margin. The outer edge of the continental margin that stems from such seafloor highs may be delineated in accordance with the second sentence of paragraph 6 and therefore go further seaward than 350 nm from the baselines.[140] Given its non-exhaustive nature, this provision provides little guidance concerning which seafloor highs lack such characteristics. It is observed in the Training Manual that '[a]lthough these morphological features are commonly associated with the continental margin, they are not diagnostic of the margin. So there must be additional criteria to qualify them as natural components of the continental margin and to distinguish them from the category of

[137] See Voelcker, 'Qu'est qu'une "dorsale" au sens de l'article 76 de la Convention de 1982 sur le droit de la mer? Quelques remarques et commentaires à propos des revendications sur le plateau continental arctique' (n 54) 955– 65.

[138] Excerpt from art 76(6) of UNCLOS.

[139] In its recommendations to Iceland regarding the Ægir Basin, the CLCS held in this regard that '[t]he depth constraint line lies entirely landward of the distance constraint line in the Ægir Basin. Consequently, the 350 M distance line is the applicable constraint'. Summary of Recommendations of the Commission on the Limits of the Continental Shelf of 10 March 2016, in regard to the Submission made by Iceland in the Ægir Basin Area and in the Western and Southern Parts of Reykjanes Ridge on 29 April 2009, para 41. <http://www.un.org/depts/los/clcs_new/submissions_files/isl27_09/2016_03_10_sc_isl.pdf>.

[140] The second sentence of art 76(6) provides: 'This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.'

submarine ridges.'[141] The above appears also in the records from the Conference.[142] Commentators have observed that if 'the reference to "natural component" in the second sentence of paragraph 6 is to have a substantive meaning distinct from that of "natural prolongation" in paragraph 3 of Article, it must be translated into a geological requirement. Otherwise, "natural component" would appear as somewhat of a hollow, tautological expression.'[143] The Training Manual states that 'to qualify as a natural component of the continental margin, an elevation will have to be in geological continuity with the margin along its full extent, i.e. it has to share the geological characteristics and origin of the landmass of the coastal State'.[144] Two former members of the CLCS have also observed that 'the main diagnostic characteristic of a seafloor high that is a natural component of the continental margin is its geological continuity, throughout its entire extent, with the landmass of the coastal State'.[145] This approach also appears in the views of other authors, who emphasize that 'the term "natural components of the continental margin" must imply a higher standard than natural prolongation with respect to the connection between seafloor highs and the continental margin'.[146] Thus, according to this understanding, in order for a seafloor high to constitute a submarine elevation that is a natural component of the continental margin it must share geological characteristics with the land mass from which the seafloor high is a submerged prolongation.[147] It seems clear that this is not reflected in the reasoning of

[141] Training Manual, VII-33.

[142] Denmark is quoted for stating that a submarine elevation that is a natural component of the continental margin should 'belong to fundamentally the same geological structure as the land territory of the coastal State in question and would support paragraph 5 *bis* only if that interpretation applied'. Doc Off. vol. XIII, at 17, para 96.

[143] NSM Antunes and F Pimentel, 'Reflecting on the Legal and Technical Interface of Article 76 of the LOSC: Tentative Thoughts on Practical Implementation', presentation at Conference organized by the ABLOS Advisory Board (28–30 October 2003) <https://www.iho.int/mtg_docs/com_wg/ABLOS/ABLOS_Conf3/PAPER3-1.PDF> 22.

[144] Training Manual, VII-32.

[145] Brekke and Symonds, 'The Ridge Provisions of Article 76 of the UN Convention on the Law of the Sea' (n 62) 187.

[146] J Gao, 'The Seafloor Highs Issue in Article 76 of the LOS Convention: Some Views from the Perspective of Legal Interpretation' (2012) 43 ODIL 119, 129. Oxman notes also that during the seventh session of the Third Conference, there were serious attempts to block any continental shelf entitlement from extending beyond the 200 nm distance line. Others, among which the Soviet Union was a principal figure, were for obvious reasons opposed to limiting the continental shelf entitlement to 200 nm from the baselines, as this formula 'ignores the *geological* basis of the continental shelf doctrine … and it might stimulate demands for a universal 300-mile zone, irrespective of geology'. B Oxman, 'The Third United Nations Conference on the Law of the Sea: The Seventh Session (1978)' (1979) 73 AJIL 1, 21.

[147] The International Law Association Committee established to analyse art 76 held in this regard that the qualification in art 76(6) indicates that submarine elevations that are natural components of the continental margin 'can be distinguished as separate features but at the same time are closely linked to the continental margin. This is the case for features which, although at some point in time were not a part of the continental margin or have become detached from the continental margin, have, through geological processes, become or remained so closely linked to the continental margin as to become or remain a part of it.' International Law Association, Toronto

ITLOS when it dismisses the role of geology for the purpose of demonstrating entitlement to the area beyond 200 nm.[148] As has been demonstrated, geology can play a role with regard to the determination of the seaward extent of the continental margin, but only in the context of the evidence to the contrary rule, ie as an exception to the general rule under Article 76(4)(b) of UNCLOS. By contrast, geology has a central role in the application of Articles 76(5)-(6) of the Convention, which obviously is also a nuance not reflected in the finding of ITLOS.

2. Developments by the CLCS

The CLCS has not been unaware of the need to clarify its understanding of the constitutive criteria for classifying a seafloor high as a submarine elevation that is a natural component of the continental margin. The Guidelines shed some light on the understanding of the CLCS in relation to key provisions in Article 76(6). The guiding criterion in the Guidelines is also geology, but in the context of whether the continental margin is active[149] or passive.[150] The CLCS says that it is 'relevant to consider the processes that form the continental margins and how continents grow'[151] in order to determine which seafloor highs are submarine elevations that are natural components of the continental margin. The CLCS notes for these purposes that the 'growth of the present continents is and/or was primarily caused by geological processes along the continental margins'.[152] It is thus clear that the classification of a seafloor high as a submarine elevation that is a natural component of the continental margin according to the Guidelines is contingent upon the documentation of a geological continuity with the land mass from which such a seafloor high is the submerged prolongation.

The Guidelines are adopted by a treaty body and therefore not binding on States Parties to UNCLOS. It is nevertheless difficult to ignore that the above-mentioned references to geological factors are in a document seen as essential for determining, *inter alia*, which seafloor highs are submarine elevations that are natural components of the continental margin. It is noteworthy that provisional guidelines were submitted to States Parties and non-States Parties to UNCLOS for comments[153] prior to their adoption by

Conference (2006), Legal Issues of the Outer Continental Shelf, Second Report, at 6. Symonds *et al.* note that '[t]he use of the term natural components in article 76.6 suggests that the features must be physically part of the margin and may be taken to imply a geomorphic and/or geologic definition of what is a natural component.' PA Symonds *et al*., 'Ridge Issues' in PJ Cook and CM Carleton (eds), *Continental Shelf Limits: The Scientific and Legal Interface* (OUP 2000) 300, 301.

[148] ITLOS, *Bay of Bengal*, para 435.

[149] For a description of active margins, see point 6.2.3(a) of the Guidelines.

[150] For a description of passive margins, see point 6.2.3(b) of the Guidelines.

[151] Point 7.3.1 of the Guidelines.

[152] ibid.

[153] Provisional Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf, adopted on 4 September 1998. CLCS/L.6.

the CLCS. While this exercise resulted in significant changes to various provisions, point 7.3.1 of the Guidelines, relating to constitutive criteria of submarine elevations that are natural components of the continental margin, is identical to the provision in its precursor. While the Guidelines cannot constitute a subsequent agreement within the meaning of Article 31(3)(a) of the Vienna Convention[154] it does not necessarily mean that they are deprived of normative characteristics. The fact that States were given the opportunity to comment on the Guidelines, provided that their comments to the CLCS were duly considered, could support the argument that the Guidelines should be considered to be a subsequent agreement for the purpose of treaty interpretation.[155]

In its Guidelines, the CLCS holds that it 'designed these Guidelines with a view to ensuring a uniform and extended State practice during the preparation of scientific and technical evidence submitted by coastal States'.[156] It could follow that there is a clear incentive for coastal States to interpret Article 76(6) in a manner which is meticulously consistent with the Guidelines. This is particularly so since opposability of outer limits of the continental shelf is made contingent upon these being established on the basis of the CLCS recommendations. Thus, States Parties tend to align their reasoning to that being expressed in the Guidelines. This could accordingly reflect a subsequent practice within the meaning of Article 31(3)(b) of the Vienna Convention[157] despite its being at the instigation of a treaty body. Such subsequent practice may, to use the expression of the arbitral tribunal in *Interpretation of the air transport services agreement between the United States and France*

> be taken into account not merely as a means useful for interpreting the Agreement, but also as something more: that is, as a possible source of a subsequent modification, arising out of certain actions or certain attitudes, having a bearing on the juridical situation of the Parties and on the rights that each of them could properly claim.[158]

[154] Art 31(3)(a) of the Vienna Convention provides: 'There shall be taken into account, together with the context: (a) Any subsequent agreement between the parties regarding the interpretation of the treaty or the application of its provisions.'

[155] On this issue see B Kunoy, 'The Terms of Reference of the Commission on the Limits of the Continental Shelf: A Creeping Legal Mandate' (2012) 25 LJIL 109–30.

[156] Guidelines, point 1.4.

[157] Art 31(3)(b) of the Vienna Convention provides: 'There shall be taken into account, together with the context … Any subsequent practice in the application of the treaty which establishes the agreement of the parties regarding its interpretation.' A Aust notes nevertheless that '[g]enerally accepted, however, does not mean that all states parties have to have engaged in a practice, only that all have accepted it, albeit tacitly'; *Modern Treaty Law and Practice* (CUP 2007) 191.

[158] Arbitral Award of 22 December 1963, *Interpretation of the air transport services agreement between the United States and France,* RIAA, vol. XVI, at 5–74. The Permanent Court stated that '[t]he facts subsequent to the conclusion of [a treaty] can only concern the Court in so far as they are calculated to throw light on the intention of the Parties at the time of the conclusion of that Treaty'. PCIJ, *Article 3, Paragraph 2 of the Treaty of Lausanne (Frontier between Turkey and Iraq)*, Advisory Opinion of 21 November 1925, PCIJ Ser. B, No 12, at 24. Yet, Nolte has also

Against this background, it is clear that the Guidelines must be considered relevant for determining which criteria are to be fulfilled in order for a seafloor high to constitute a submarine elevation that is a natural component of the continental margin. The practice of the CLCS indicates also that the criteria outlined in the Guidelines are applied in its assessments of whether the submitted data and documentation are sufficient to determine that a seafloor high is a submarine elevation that is a natural component of the continental margin. It should be noted that in its assessment of whether the 'Ridge Part' of the Izu-Ogaswara Arc could be considered a submarine elevation that is a natural component of the continental margin of Japan, the CLCS made explicit reference to point 7.3.1(a) of the Guidelines. Its reasoning underlying its decision not to consider the classification of the Ridge Part of this feature as a submarine elevation that is a natural component of the continental margin was based on the above-mentioned provision of the Guidelines, considering it to be 'a submarine ridge in the sense of article 76, paragraph 6'.[159] The same approach is also reflected in the recommendations to Australia. The CLCS did not accept that Joey Rise could be classified a submarine elevation that is a natural component of the continental margin: 'Australia classifies the Joey Rise as a submarine elevation that is a natural component of the continental margin in the sense of article 76, paragraph 6 … The view of the Commission, however, is that the data presented on the origin of the Joey Rise is too sparse to be conclusive. Therefore the Commission does not consider it proven that the Joey Rise should be regarded as a submarine elevation that is a natural component of the continental margin in the sense of article 76, paragraph 6.'[160]

observed that the ICJ and arbitral tribunals do 'not limit its use of subsequent practice to serving as a means of interpretation, but also as a way of recognizing modifications of treaty obligations over time.' G Nolte, 'Subsequent Practice as a Means of Interpretation in the Jurisprudence of the WTO Appellate Body' in E Cannizzaro (ed), *The Law of Treaties beyond the Vienna Convention* (OUP 2011) 138, 141–2.

[159] Summary of Recommendations of CLCS to Japan, para 120(v). See also recommendations of the CLCS to Australia in which it refused to admit that the Williams Ridge was a submarine elevation that is a natural component of the continental margin. The CLCS stressed that 'the data submitted for the WR seems to give only indirect evidence of its nature and origin and the Commission is of the opinion that the geological origin of the WR still remains unresolved. The Commission therefore questions whether the application of paragraph 7.3.1(b) of the Guidelines is justified in the case of the WR. Therefore the Commission does not consider it justified that the WR is regarded a submarine elevation that is a natural component of the continental margin in the sense of article 76, paragraph 6.' Recommendations of the Commission on the Limits of the Continental Shelf in regard to the Submission made by Australia on 15 November 2004, adopted on 9 April 2008, para 51 <http://www.un.org/depts/los/clcs_new/submissions_files/aus04/Aus_Recommendations_FINAL.pdf>.

[160] Recommendation of the CLCS to Australia, para 138. In its recommendations to Norway the CLCS did not admit the contention of Norway that Vøring Spur was a submarine elevation that is a natural component of the continental margin of mainland Norway, which in the view of the CLCS 'has a different evolution and geological character to the adjacent Vøring Plateau. In the view of the Commission, the Vøring Spur cannot be regarded a submarine elevation that is a natural component of the continental margin of Mainland Norway in the sense of article 76.' Summary of

The practice demonstrates that CLCS considers geological continuity between the seafloor highs, on which the 2,500 m isobaths are located, and the relevant land mass of the submitting coastal State, a condition precedent for accepting proposed outer limits that are based on such seafloor highs. The CLCS has accordingly both dismissed and accepted the use of the depth constraint based on an assessment of whether or not the submitted data is considered to support an appropriate geological continuity from the seafloor high to the land mass from which it extends. Where a coastal State has failed to document geological continuity, the CLCS has refused to consider seafloor highs as submarine elevations that are natural components of the continental margin. Thus, a formal understanding of the CLCS appears to be established with regard to the processes for determining which seafloor highs are submarine elevations that are natural components of the continental margin and therefore eligible for use of the depth constraint in accordance with the second sentence of Article 76(6). This understanding is in line with the notions and developments that are outlined in the relevant provisions of the Guidelines. However, there remain several outstanding questions.

3. *Required standard of proof*

One difficulty is the standard of proof that is required to demonstrate geological continuity with the land mass. It is noteworthy that in its observations on whether Norway had demonstrated geological continuity between the Jan Mayen Micro Continent/Icelandic Plateau and the land mass of the Norwegian overseas island Jan Mayen, the CLCS approved Norway's documentation by applying an 'on balance' standard.[161] The same standard also appears in the CLCS recommendations to Australia. The CLCS held that 'on the basis of the data and information presented the geological origin of the whole Wallaby Composite High still remains unresolved'.[162] Given the requirements under Article 76(6) of UNCLOS and the Guidelines, it might therefore have been expected that the CLCS would not accept the Wallaby Composite High as a submarine elevation that is a natural component of the continental margin of Australia. However, although the geological history remained unresolved, the CLCS held '[n]evertheless, on the *balance* of morphological and geological evidence presented, the [CLCS] agrees that the Wallaby Composite High is to be regarded as a submarine elevation that is a natural component of the continental margin in the sense of Article 76,

Recommendations of the CLCS with regard to the partial submission of Norway on 27 November 2006, adopted on 27 March 2009, para 76 <http://www.un.org/depts/los/clcs_new/submissions_files/gbr08/gbr_asc_isl_rec_summ.pdf>.

[161] The CLCS held that 'on balance the JMMC/IP composite high is a submarine elevation that is a natural component of the continental margin of Jan Mayen in the sense of article 76, paragraph 6'. Summary of the Recommendations to Norway, para 77.

[162] Summary of the Recommendations to Australia, para 137.

paragraph 6'.[163] This approach fails to offer meaningful or conclusive guidance about the extent to which geological data may be relevant, and thus is unhelpful to other States that will be seeking to classify seafloor highs as submarine elevations that are natural components of the continental margin.

More recently, a majority decision of the sub-commission established to consider the partial submission of Iceland dated 27 April 2009 appears to have agreed with Iceland's classification of Reykjanes Ridge as a submarine elevation that is a natural component of the continental margin of Iceland.[164] Because of a disagreement on this issue, the CLCS was unable to take a position[165] on the recommendations of the sub-commission until its fortieth session.[166] In its recent recommendations to Iceland, the CLCS held 'that the data and information contained in the Submission were inconclusive to support the western and southern parts of the Reykjanes Ridge as a natural component of the continental margin of Iceland'.[167] It remains unclear in what sense, or according to which criteria, this data was considered *inconclusive.* It is also difficult to confirm whether there is a substantive difference between a finding that the geological history of a feature is 'unresolved'[168] and a finding, for example, that the data and information submitted are 'inconclusive'.[169] Moreover, the CLCS has not explained why the data relating to the classification of the Wallaby Composite High was apparently deemed conclusive notwithstanding the geological origin of the seafloor high being 'unresolved'[170] while the data relating to the Reykjanes Ridge apparently is unresolved but inconclusive for the purpose of the second sentence of paragraph 6 of Article 76. Further, it appears that the CLCS is not in agreement regarding which data is conclusive for the purpose of such classifications. This becomes clear as 'some members of the Commission accepted the consideration of the Reykjanes Ridge as a

[163] ibid (emphasis added).

[164] The sub-commission adopted the draft recommendations by majority on 27 February 2014 and then transmitted them to the CLCS on 3 March 2014. CLCS/83, Statement by the Chair on the Progress of Work in the Commission on the Limits of the Continental Shelf (31 March 2014) para 63.

[165] Consistent with Rule 35 of the Rules of Procedure of the CLCS, it is obligated to seek to reach consensus in its decision-making. Where this is not possible, 'decisions of the Commission, subcommission or subsidiary body on all matters of substance shall be taken by a two-thirds majority of the members present and voting'. Excerpt from Rule 37 of the Rules of Procedure of the CLCS.

[166] The Under-Secretary-General for Legal Affairs of the United Nations made a statement upon the opening of the fortieth session of the CLCS, *inter alia*, encouraging the CLCS 'to make all efforts with a view to finalizing the examination of submissions carried out during the past four years and approving draft recommendations which are currently before the Commission'. CLCS/93, Statement by the Chairman of the Commission on the progress of work in the Commission (18 April 2016) para 5.

[167] Summary of Recommendations to Iceland, para 78.

[168] Summary of the Recommendations to Australia, para 137.

[169] Summary of Recommendations of the CLCS to Iceland, para 78. <http://www.un.org/depts/los/clcs_new/submissions_files/isl27_09/2016_03_10_sc_isl.pdf>.

[170] Summary of the Recommendations to Australia, para 137.

submarine elevation based on the data and information included in the Submission'.[171]

It is difficult to draw conclusions from this. Consensus on the CLCS recommendations to Iceland was only reached '[f]ollowing extensive deliberations by the Commission [during which] the Chair of the Commission presented a proposal which became a basis for a consensual outcome of those deliberations'.[172] Thus, it would be wise not to draw firm conclusions from these summaries of recommendations. It should nevertheless not be excluded that, whilst framed otherwise, the disagreement relates to morphology rather than geology,[173] assuming that morphology should also be a factor in classifying a seafloor high to be a submarine elevation that is a natural component of the continental margin. Whether morphology should have a say in this might have a determinative role for establishing the permissible seaward extent of entitlements to the outer continental shelf in the Central Arctic Ocean.

B. Natural Components of the Continental Margin in the Central Arctic Ocean

One of most challenging questions relating to the entitlements to the outer continental shelf in the Central Arctic Ocean concerns the nature of the Alpha-Mendeleev Ridge System and the Lomonosov Ridge for the purposes of Article 76(6) of UNCLOS.[174] The fact that these seafloor highs are called ridges does not prejudge the question whether they constitute submarine elevations that are natural components of the continental margins.[175]

1. Classification of the Lomonosov Ridge

It was argued in an article from 1980 that '[b]y no stretch of imagination can oceanic ridges such as the Mid-Atlantic Ridge properly be regarded as falling within this definition of the continental margin, nor can the sides of these great mountain chains be regarded as the foot of the continental slope for purposes of

[171] Summary of Recommendations of the Commission to Iceland, para 76.

[172] CLCS/93, Statement by the Chairman of the Commission on the progress of work in the Commission (18 April 2016) para 21.

[173] During the Ninth Session at the Third Conference, Iceland is noted for having stated that 'the new provision regarding submarine ridges meant that the 350-mile limit criterion would apply to ridges which were a prolongation of the land mass of the coastal State concerned.' Doc Off. vol. XIII, at 17, para 96.

[174] It is recalled that by contrast to the 350 M constraint line applicable to submarine ridges, submarine elevations that are natural components of the continental margin are consistent with art 76(6) of UNCLOS subject to the depth constraint.

[175] Point 7.1.8 of the Guidelines provides that '[t]he distinction between the "submarine elevations" and "submarine ridges" … shall not be based on their geographical denominations and names'.

applying the Irish formula'.[176] The facts, as they present themselves today, suggest the contrary.[177] This appears unambiguously in the recommendations of the CLCS to the United Kingdom regarding Ascension Island. The CLCS only refused to accept the proposed outer limits of the United Kingdom because the base of slope, and associated foot of slope points, was located at a distance that does not permit the establishment of an outer edge of the continental margin that extends beyond the 200 nm distance line.[178] Thus, the refusal to accept the proposed outer limits of the United Kingdom did not relate to the geology of the seafloor high on which the United Kingdom sought to establish outer limits. The disagreement related only to the identification of the base of slope under Article 76(4)(b). This recommendation of the CLCS is relevant for the Central Arctic Ocean. *A fortiori*, if mid-Atlantic ridges can form part of the continental margin, nothing should prevent similar morphological seafloor highs forming part of coastal States' continental margins in the Central Arctic Ocean. Rather, the question is whether narrow and elongated seafloor highs can constitute submarine elevations that are natural components of the continental margin.

There appears to be some evidence of practice by the CLCS indicating that it does not make morphological criteria a condition precedent for classifying a seafloor high as a submarine elevation that is a natural component of the continental margin. Thus, whether a seafloor high has a morphological shape of a ridge or plateau is irrelevant for the purposes of Article 76(6) of UNCLOS. This is true in so far as the seafloor high is geologically continuous with the land mass. It has been observed that '[t]he view that the inclusion of paragraph 6 in article 76 was intended to limit the continental shelf to 350 [nm] on submarine ridges of an oceanic origin is confirmed by a number of commentaries on the negotiations'.[179] *A fortiori*, where the ridge-like feature is continental, and shares such characteristics with the land mass, it should not fall within the first sentence of Article 76(6). The Guidelines are instructive in this regard. The provisions in point 7.3.1 elaborate in some detail the 'geological processes'[180] that indicate constitutive criteria of submarine elevations that are natural components of the continental margins. These provisions do not include considerations relating to morphology. Thus, it must be assumed that the CLCS should not consider the morphological shaping of a seafloor high to be relevant for the purposes of classifying them

[176] B Oxman, 'The Third United Nations Conference on the Law of the Sea: The Eighth Session (1978)' (n 146) 21.

[177] It should be added that the statement from 1980 referred to above was made prior to the compromise, which resulted in the inclusion of para 6 of art 76 and, as has been observed elsewhere, seafloor highs which might not be considered part of the continental margin prior to the above-mentioned compromise 'would be included in the definition of the continental shelf by this amendment.' International Law Association, Toronto Conference (2006) (n 147) 6.

[178] Summary of the Recommendations to the United Kingdom, para 45.

[179] International Law Association, Toronto Conference (2006) (n 147) 6.

[180] Excerpt from point 7.3.1 of the Guidelines.

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as submarine elevations that are natural components of the continental margin.[181] This logic appears to be reflected in the CLCS recommendations to New Zealand in which various elongated ridge-like features were considered submarine elevations that are natural components of the continental margin and therefore subject to the more favourable constraint under Articles 76(5)-(6).[182] These CLCS recommendations could to some extent be considered relevant to the question of whether the Lomonosov Ridge can constitute a submarine elevation that is a natural component of the continental margin. This could not only be relevant for Russia but for other coastal States abutting the Central Arctic Ocean as well, including Denmark/Greenland.[183]

It appears in the recommendations to Russia from 2002 that the CLCS did not dismiss the idea that the Lomonosov Ridge is a submarine elevation that is a natural component of the continental margin of Russia. Russia states, in its revised partial submission relating to the Arctic, that the CLCS held with regard to its initial submission 'that *taking into account the information* provided in the Submission, the Lomonosov Ridge cannot be considered as a submarine elevation under the Convention'.[184] Rather, it would appear that the information provided in the submission of Russia was insufficient to draw this conclusion. This seems to stand in contrast to the views expressed by the United States that the Lomonosov Ridge 'is a freestanding feature in the deep, oceanic part of the Arctic Ocean Basin, and not a natural component of the continental margins of either Russia or any other State'.[185] Leaving aside the question whether the morphological setting enclosing the Lomonosov Ridge fits the characteristics of a ridge-like feature,[186] the above comment of the United States[187] appears to support the view that geometry is a constitutive

[181] It should also be noted that in so far so concerns active margins, the Guidelines provide that '*any* crustal fragment or sedimentary wedge that is accreted to the continental margin should be regarded as a natural component of that continental margin.' Excerpt from point 7.3.1(a) of the Guidelines (emphasis added).

[182] The CLCS held that it agreed with the submitting coastal State 'that the Kermadec and the Colville Ridge system as well as the Three Kings Ridge with the Fantail terrace are natural components of the continental margin'. Summary of the Recommendations of the CLCS to the partial submission of New Zealand, para 145.

[183] The entitlement claim of Denmark/Greenland extends along the flanks of the Lomonosov Ridge up to the 200 M distance line from Russia. It results in an outer continental shelf entitlement claim extending up to approximately 950 M from the baselines of Greenland.

[184] Executive Summary of the revised partial submission of Russia relating to the Arctic area of 3 (August 2015) at 12, available on the website of DOALOS (emphasis added).

[185] Excerpt from diplomatic note of the United States, 3.

[186] The International Hydrographic Organization has characterized ridges as 'elongated narrow elevations of varying complexity having steep sides' (4th edn, 'Standardization of Undersea Feature Names', Bathymetric Publication No 6, November 2008). The CLCS made reference to this definition its its recommendations to the United Kingdom in regard to the Ascension Island (para 26).

[187] It should nevertheless be observed that in its note of 30 October 2015 in relation to the transmission to the CLCS of the revised submission of Russia of 3 August 2015, relating to the Arctic, the United States does not reiterate any of the substantive views that were expressed in its note of 18 March 2002, upon the transmission of the original submission of Russia to the CLCS.

criterion for the purpose of classifying a seafloor high a submarine elevation that is a natural component of the continental margin.

It should be noted that whilst several elongated ridge-like features were accepted as individual submarine elevations that are natural components of the continental margin of New Zealand, it would appear that the CLCS attached some importance to the particular morphological interrelations of these ridge-like seafloor highs. The CLCS did not consider the seafloor highs in question as *freestanding features* but part of a more complex system. The CLCS stressed that '[t]he Kermadec and Colville Ridges form a set of *coalesced* ridges with the Kermadec Ridge facing the Pacific Ocean to the east and the Colville Ridge facing the South Fiji Basin to the west'.[188] Whether this helps the coastal States in the Central Arctic Ocean is unclear. Firstly, it is not clear whether they consider the Lomonosov Ridge to be part of a geological complex system within which the Alpha-Mendeleev Ridge System is an integral part or whether they consider them separate seafloor highs. Secondly, it is difficult to determine the meaning and scope of the notion of *coalesced ridges* and its possible implication for classifying the Lomonosov Ridge within either of the typologies of seafloor highs under Article 76(6) of UNCLOS. However, the CLCS is aware that submitting coastal States examine its summary of recommendations meticulously in order to see what support they can offer for their own claims.[189]

Against this background, it can be concluded that the classification of the Lomonosov Ridge as a submarine elevation that is a natural component of the continental margin is contingent upon the demonstration of morphological and geological continuity with the relevant land mass. While neither UNCLOS nor the Guidelines appear to attach any role to geometry for the purposes of classifying the seafloor highs as submarine elevations that are natural components of the continental margin, the practice of the CLCS does not appear to conclusively rule this out. Yet, as the recommendations to Iceland illustrate there appear to be opposite views on this very question within the CLCS.

2. *Classification of the Alpha-Mendeleev Ridge System*

According to established practice, the test of appurtenance with regard to the Alpha-Mendeleev Ridge can be conducted exclusively in accordance with Article 76(4) in which, when reliance is not made on the evidence to the

[188] Summary of the Recommendations of the CLCS to New Zealand, para 136 (emphasis added).

[189] In its Note Verbale to the Secretary-General of the United Nations of 11 January 2011, the United Kingdom stated in relation to the CLCS recommendations on Ascension Island that it 'will await with interest the outcomes of future submissions which raise similar issues of legal interpretation of the Convention, and in particular those submissions which relate to the entitlement of coastal states to continental shelf areas beyond 200 [M] on the basis of mid-ocean ridges'. <http://www.un.org/depts/los/clcs_new/submissions_files/gbr08/gbr_nv_11jan2011.pdf>.

contrary rule, geology does not have a constitutive role for determining the permissible outer edge of the continental margin. Assuming that the outcome of such an analysis identifies a common envelope of the continental slope, which provides for the establishment of an outer edge that extends beyond the 200 nm distance line, the question becomes one of whether this seafloor high is a submarine elevation that is a natural component of the continental margin.

The Executive Summary to the partial revised submission of Russia from August 2015 says that in its 2002 recommendations to Russia, the CLCS refused to classify the Alpha-Mendeleev Ridge System as a submarine elevation that is a natural component of the continental margin. In doing so, the CLCS referred to the 'current state of scientific knowledge'[190] relating to the geological history of this seafloor high. This stands in marked difference from the arguments given for refusing to recognize the putative classification of the Lomonosov Ridge as a submarine elevation that is a natural component of the continental margin of Russia. In relation to the Lomonosov Ridge the CLCS referred to the inadequacy of the documentation presented to the CLCS. By contrast, in dismissing the putative classification of the Alpha-Mendeleev Ridge as a submarine elevation that is a natural component of the continental margin, as presented in the submission of Russia in 2001, the CLCS refers to the very basis for understanding the geological setting in the region surrounding the Alpha-Mendeleev Ridge System. While the revised partial submission of Russia appears again to rely on the Alpha-Mendeleev Ridge System as being a submarine elevation that is a natural component of the continental margin, it appears that Denmark/Greenland have refrained from classifying it as such. The Executive Summary of the partial submission of Denmark/Greenland states that the 'submitted data and other material in this Partial Submission do not provide for [the] classification [of the Alpha-Mendeleev Ridge System] as submarine elevations that are natural components of the Northern Continental Margin of Greenland'.[191] This suggests that it is not necessarily the extent of scientific knowledge about this seafloor high that points to the conclusion that the Alpha-Mendeleev Ridge System should not be classified a submarine elevation that is a natural component of the continental margin. Rather that there is a lack of sufficient data to support such a claim.

The outstanding question appears to be, what is the level of documentation required for large oceanic igneous provinces such as the Alpha-Mendeleev Ridge System, superposed with volcanic lava, to be considered as submarine elevations that are natural components of the continental margin of land

[190] ibid.

[191] Executive Summary of the Partial Submission of Denmark/Greenland regarding the Northern Continental Shelf of Greenland, at 14 <http://www.un.org/depts/los/clcs_new/submissions_files/dnk76_14/dnk2014_es.pdf>.

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masses with continental crust? To phrase this differently, what is the required level of geological affinity with the land mass necessary for such a large igneous province to constitute a submarine elevation that is a natural component of the continental margin? The CLCS recommendations to Australia could be instrumental in this regard, at least as concerns its appreciation of evidence provided by the submitting coastal State with regard to the geological history of the Wallaby Composite High. In its recommendations to Australia the CLCS recognized that 'the geological origin of the whole Wallaby Composite High still remains unresolved'.[192] Given that the notions 'submarine ridges' and 'submarine elevations' are two 'distinct legal categories'[193] and that the geological setting around the seafloor high in question is unresolved, it would appear fair to assume that the Wallaby Composite High could not be considered a submarine elevation. However, the CLCS decided otherwise. Upon establishing that the geological history is unresolved, it found that '[n]evertheless, on the *balance* of morphological and geological evidence presented, the [CLCS] agrees that the Wallaby Composite High is to be regarded as a submarine elevation that is a natural component of the continental margin in the sense of Article 76, paragraph 6'.[194] It would follow that merely because the supposed continental affinity of the Alpha-Mendeleev Ridge System with the coastal States abutting the Central Arctic Ocean is 'unresolved'—to use the language of the CLCS— this does not necessarily preclude the recognition of this seafloor high as being a submarine elevation that is a natural component of the respective continental margins. Yet, the CLCS appears to have reached opposite conclusions in its recommendations to France regarding New Caledonia. France argued that the whole seafloor structure between the South Fiji basin in the east and the Tasman Sea in the west formed part of the submerged prolongation from New Caledonia. The CLCS was not able to accept this view 'on the basis of uncertain nature of the crust beneath the New Caledonian Basin separating the Lord How Rise (with its northern extension into Fairway Ridge and Bellona and Chesterfield islands) and the Norfolk Ridge … Therefore the Subcommission recommended to France that the Lord Howe Rise should be viewed as one entity not connected to the ridges further east.'[195] Thus, while the CLCS in some cases, despite having insufficient data to allow it to make a conclusive determination, has not refrained from endorsing coastal States classifications of seafloor highs as submarine elevations that are natural components of the continental margin,

[192] Summary of the Recommendations to Australia, para 137.
[193] Excerpt from point 7.1.6 of the Guidelines.
[194] Summary of the Recommendations to Australia, para 137 (emphasis added).
[195] Summary of Recommendations of the Commission on the Limits of the Continental Shelf in regard to the submission made by Frane in respect of French Guiana and New Caledonia Region of 22 May 2007, adopted on 2 September 2009, para 48.

there are also precedents in which the apparent insufficiency of the data has caused such classifications to be rejected.

There are also situations in which there is no material reasoning in support of the CLCS's conclusion. This is a matter of concern, in particular in light of the fact that such recommendations *a priori* deprive the relevant coastal State of insight into how to seek to revise the submission with a view to overcoming the problems posed by inadequate documentation. It is difficult to draw firm conclusions from the CLCS recommendation summaries. This is mainly due to apparent contradictions regarding the required standard of proof to determine that there is sufficient and conclusive evidence to demonstrate that the relevant seafloor highs, which are sought to be classified as submarine elevations that are natural components of the continental margin, share geological characteristics with the land mass of the submitting coastal State. Yet, the excerpts above shed some light on the documentation required to evidence that large igneous provinces, such as the Alpha-Mendeleev Ridge System, are submarine elevations that are natural components of the continental margin. Whether the scientific understanding relating to the geological history of the Alpha-Mendeleev Ridge System has changed since the CLCS adopted its recommendations to Russia in 2002 is a matter for scientists to determine.[196] This does not alter the firm understanding that the classification of such seafloor highs must be determined according to legal hermeneutics, to the extent that it relates to matters regarding the interpretation of Article 76(6) of UNCLOS. Yet, to a large extent, the application of that provision involves demonstrating whether there is a geological affinity connecting the Alpha-Mendeleev Ridge system with the land mass of the relevant States. Russia notes that the CLCS agreed to its position that 'the Mendeleev-Alpha Rise [was] formed as a large volcanic oceanic plateau built on the oceanic crust of the Canada Basin after its opening as a result of passage of the magmatic "hot spot"'.[197] However, the CLCS did not accept the Russian position concerning the 'continental origin'[198] of the Alpha-Mendeleev Ridge System.

Russia does not conceal its strong reservations about some of the conclusions of the CLCS. One such reservation relates to the fact that '[b]asalt samples, on the basis of which far reaching conclusions about the origin of the Mendeleev-Alpha Rise were made in 2002, were taken only in one place. Contradictory information was given about the composition of these volcanic rocks.'[199]

[196] Russian scientists have expressed support for the conclusion that the Alpha-Mendeleev Ridge is of continental origin. It is argued that the collected data for the purpose of the preparation of the revised partial submission of Russia provides 'evidence [which] favour[s] the conclusion that the Mendeleev Ridge is composed, at least in part, of attenuated underplated continental crust'. NN Lebedeva-Ivanova *et al.*, 'Seismic profiling across the Mendeleev Ridge at 82°N: Evidence of continental crust' (2006) Geophysical Journal International 539.

[197] Executive Summary of the revised partial submission of Russia relating to the Arctic area of 3 August 2015, at 12. [198] ibid. [199] ibid 13.

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Russia takes the position that, while the documentation included in the initial submission was sparse, the revised submission is based on a developed pool of data[200] and, it must be assumed, provides a more solid basis for accepting that the Alpha-Mendeleev Ridge System is a submarine elevation that is a natural component of the continental margin of Russia. It appears that Denmark/Greenland are less sure about the continental origin of the Alpha-Mendeleev Ridge System. It is stated in the publicly available data that whether the latter seafloor high 'was emplaced on oceanic crust or continental crust is debated'.[201] A recently published article by Russian scientists states that a bottom rock material study, the processing and analysis of which was used in the preparation of the updated Russian submission relating to the Arctic, has proved the existence of continental type of basement crust at deep water rises in the Central Arctic Ocean.[202] However, reservations have been expressed concerning the interpretation of the Russian scientists.[203] These controversies clearly show that the key issue relating to the classification of the Alpha-Mendeleev Ridge Complex relates to the level of geological affinity with the land mass in order to classify this seafloor high a submarine elevation that is a natural component of the continental margin. This arises as this determination determines whether the seafloor high in question is subject to either of the constraints in Article 76(5), as it falls within the material ambit of the second sentence of paragraph 6 or whether it is subject to the more strict 350 nm distance constraint.

It is reasonable to assert that, failing the demonstration of geological affinity, the Alpha-Mendeleev Ridge System, or parts thereof, will be considered

[200] Russia states in its Executive Summary to the revised submission of 3 August 2015 that '[i]n 2005–2014, the Russian organizations carried out a wide range of geological and geophysical studies in order to prepare a partial revised Submission of the Russian Federation in the Arctic Ocean taking into account the recommendations of the Commission of 2002. After 2002, in the central Arctic Basin Russia accomplished: deep seismic sounding of over 4,000 km; over 23,000 km of MCS lines; over 35,000 km of bathymetry survey; 120 stations of geological sampling.' ibid.

[201] Executive Summary of the Partial Submission of Denmark/Greenland regarding the Northern Continental Shelf of Greenland, at 14. It is further provided that evidence suggests 'that at least parts of the southern Alpha Ridge include highly attenuated continental crust' (ibid).

[202] АФ Морозов *et al.*, 'Новые геологические данные, обосновывающие континентальную природу области Центрально-Арктических поднятий', *Журнал Региональная геология и металлогения* (2013) No 53, 34 – 55 (AF Morozov *et al.*, 'New Geological Data Are Confirming Continental Origin of the Central Arctic Rises' (2013) 53 Journal Regional Geology and Metallogeny 34–55.

[203] It is observed that Morozov *et al.* 'suggest the Mendeleev Ridge is composed of "thinned underplated continental crust or thickened oceanic crust", but they prefer a continental origin. In a benchmark paper, Christensen & Mooney (1995) compile global results for the velocity structure of continental crust. Rifted continental crust reveals the highest velocity gradients of the various tectonic environments presented. Velocity gradients for rifted continental crust are considerably less than those observed by Ivanova et al. (2006), potentially arguing against a continental origin for the Mendeleev Ridge. The velocity structure presented by Lebedeva-Ivanova et al. (2006) is more consistent with thickened oceanic crust observed at oceanic plateaus … or volcanic continental margin crust.' D Dove *et al.*, 'Bathymetry, controlled source seismic and gravity observations of the Mendeleev ridge; implications for ridge structure, origin, and regional tectonics' (2010) Geophysical Journal International 494–5.

submarine ridges on which the outer limits cannot exceed 350 nm from the baselines. It can thus be concluded that the claims of the Arctic States to outer continental shelf entitlements will depend on complex geological considerations. This is true with regard to both the classification of the Lomonosov Ridge and the Alpha-Mendeleev Ridge System. Thus, while ITLOS has made it clear that a significant geological discontinuity does not prevent an entitlement extending beyond 200 nm,[204] this does not mean that geology is irrelevant for determining the seaward extent of entitlement to the outer limits of the continental shelf. Quite the contrary. Geology is given a pivotal role for determining whether entitlement extends beyond the 350 nm distance constraint line. Thus, the entitlements to large areas of the Central Arctic Ocean are contingent upon their fulfilling geological criteria, since large areas of claimed entitlements depend on seafloor highs being classified as submarine elevations that are natural components of the coastal States respective continental margins.

V. CONCLUDING REMARKS

It is not unusual for States whose claims to outer continental shelves overlap to not consent to the CLCS considering them.[205] The Central Arctic Ocean is different in that regard. All relevant coastal States have consented to the CLCS considering their submissions. The CLCS should finalize its consideration of the partial revised submission of Russia in the near future. This will shed further light on issues to which other coastal States with overlapping claims of entitlements will pay much attention. Of particular interest is the nature of the Alpha-Mendeleev Ridge System and whether this seafloor high will be considered a submarine elevation that is a natural component of the continental margin of a coastal State whose land mass is composed of continental crust.

The typology of seafloor highs such as the Lomonosov Ridge is equally important for the purposes of determining the seaward extent of entitlement in the Central Arctic Ocean. The central question appears to be whether morphological characteristics are relevant to the interpretation of the second sentence of Article 76(6) of UNCLOS. This article concludes that the classification of a seafloor high as a submarine elevation that is a natural component of the continental margin, and therefore eligible to benefit from

[204] ITLOS, *Bay of Bengal*, para 438.

[205] In the Statement by the Chair of the Commission on the progress of work in the Commission at the Fortieth Session, of 16 April 2016, it is provided that the consideration of eight submissions that remained next in line for consideration, as queued in the order in which they had been received, was deferred: 'Noting the absence of new communications from States, which indicated developments that would have allowed for the consideration of those submissions, the Commission decided to defer further the establishment of a subcommission to examine any of the above-mentioned submissions.' CLCS/93, para 77.

the application of the depth constraint, depends on geology. This assumes, however, that the geomorphological analysis used to identify the base of slope encloses the relevant seafloor high in a common and continuous base of slope region. Whether a seafloor high has an elongated ridge-like shape is immaterial for the purpose of classification under the second sentence of paragraph 6 in so far as the seafloor high is morphologically and geologically continuous with the land mass from which it extends. The finding of ITLOS in the *Bay of Bengal* case[206] in which it held that geology had no role concerning entitlement to the outer continental shelf should be seen through this spectrum. Thus, geology has only a secondary role in the establishment of the outer edge of the continental margin under Article 76(4)(a)-(b) but a central role in the establishment of the constraint lines under Article 76(5)-(6) of UNCLOS.

The inclusion of the Gakkel Ridge in the submission of Denmark/Greenland is one of the most challenging Article 76 related matters in the Central Arctic Ocean. Several authors argue that because this seafloor high is an active oceanic spreading ridge, it cannot constitute the submerged prolongation of any land mass that is composed of continental crust. Yet, as demonstrated in this article, the inclusion of the Gakkel Ridge in the continental margin of a coastal State whose land mass is of continental crust is, in principle, exclusively a morphologic and bathymetric undertaking. There is support for this contention under paragraphs 3, 4 and 6 of Article 76 of UNCLOS, and the practice of the CLCS although the recommendations of the CLCS in relation to the submission of the Cook Islands could suggest the contrary.

Given the lack of clarity regarding the geological setting and apparent dominant scientific acceptance that the Alpha-Mendeleev Ridge System is not of continental origin, it is beyond any doubt that the assertions of entitlements to parts of the seabed in the Central Arctic Ocean give rise to complex scientific questions as a result of the provisions of Article 76.

[206] ITLOS, *Bay of Bengal,* para. 438.

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